S. HRG. 101-1001

PREHISTORIC TRACKWAYS STUDY ACT OF 1990

HEARING

BEFORE THE

SUBCOMMITTEE ON
PUBLIC LANDS, NATIONAL PARKS AND FORESTS

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

SECOND SESSION

ON

S. 2684

TO AUTHORIZE A STUDY OF METHODS TO PROTECT AND INTERPRET THE NATIONALLY SIGNIFICANT FOSSIL TRACKWAYS FOUND IN THE ROBLEDO MOUNTAINS NEAR LAS CRUCES, NM

LAS CRUCES, NM, JULY 6, 1990

Printed for the use of the
Committee on Energy and Natural Resources

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PREHISTORIC TRACKWAYS STUDY ACT OF 1990

FRIDAY, JULY 6, 1990

U.S. SENATE,
SUBCOMMITTEE ON PUBLIC LANDS,
NATIONAL PARKS AND FORESTS,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Las Cruces, NM.

The subcommittee met, pursuant to notice, at 10 a.m. in room 96, Dona Ana Branch Community College, Las Cruces, NM, Hon. Jeff Bingaman, presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

Senator BINGAMAN. Why don't we go ahead and start. This is a hearing of the Subcommittee on Public Lands, National Parks and Forests, which is a subcommittee of the Senate Energy and Natural Resources Committee. The purpose of the hearing today is to receive testimony on Senate bill 2684, which authorizes a study of methods to protect and interpret the nationally significant fossil trackways in the Robledo Mountains near Las Cruces.

At the very first, I would like to thank Senator Bumpers, who is the chairman of this Subcommittee, for scheduling today's hearing. I am very pleased we were able to hold a hearing in Las Cruces. The record we make here will be presented to the subcommittee in Washington and will be made part of the record that we rely upon and the subcommittee relies upon in deciding whether to go forward with the legislation that I have introduced.

I think this hearing will give the citizens of southern New Mexico an excellent opportunity to learn about an impressive natural resource in this part of the state. Fossils provide a critical link to the past and allow scientists to explore the planet as it existed millions of years ago. Although fossils can be found around the world, only a few sites contain information which the scientific community considers significant.

One such site is the focus of our hearing today. The significance of this find are the spectacular fossilized trackways of amphibians, reptiles, arthropods and insects which were made 280 million years ago. The trackways are unique in length and include prints of animals previously known and some that were previously unknown. This discovery has the attention of the scientific community, which has confirmed the significance of the discovery, especially in light of the recent find of animal bones in the area.

Trackways are fossilized foot/hand prints which preserve a record of the activity of an animal during a portion of its life.

Trackways reveal information on how the animal walked, the length of their limbs, and the animals' feeding and social habits.

The trackways are also an important educational tool. They provide a dramatic illustration of animal and plant life which once existed on earth. Standing where an animal 12 feet long and weighing 600 pounds once walked is enough to stir the imagination of anyone, especially our children. These trackways allow children and students to see fossils and, in doing so, can increase their interest in science and increase their interest in learning more about this aspect of science.

Particularly, I want to just acknowledge here at the beginning that we have some distinguished guests. I know that I will be introducing others as we go through. State Senator Mary Jane Garcia is here and we appreciate her presence very much. She went with us on our tour of the trackways, which are located in her district, and we very much appreciated having her with us.

We also have students from the Las Cruces, Gadsden and Hatch school districts who are involved in the Upward Bound program. Ron Garcia and Sue Brown are here with them. Could they just indicate where they are located back here? All right. All these students over here. We are very pleased to have you here. We hope this is of interest to you.

We also have a group of 15 students from the Native American Preparatory School from around the country and they are here on the campus this week. Could they raise their hands? All you students. All right. We are glad to have you here. Gary Chapman is their sponsor and we appreciate having him here.

The legislation that is the subject of the hearing would direct the Secretary of Interior to conduct a study of the fossil trackways to determine the importance of the discovery, to evaluate how to curate, display and interpret the fossils that are found in the area, and to recommend the proper administrative designation and agency for management of the site.

The legislation also would provide for an interim withdrawal that would extend for two years after the conclusion of the study. This will assure that the area is protected until Congress can determine what permanent protection actions would be appropriate.

Senator Domenici is a cosponsor of the legislation with me in the Senate, and we have similar legislation that was introduced by Congressman Skein in the House of Representatives. Neither of them were able to be here today, but I know they are vitally interested in this issue. I look forward to the testimony of our witnesses.

[The prepared statement of Senator Bingaman and the text of S. 2684 follows:]

STATEMENT OF SENATOR JEFF BINGAMAN
SUBCOMMITTE ON PUBLIC LANDS, NATIONAL PARKS AND FORESTS OF THE SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
JULY 6, 1990

This is a hearing of the Subcommittee on Public Lands, National Parks and Forests of the Senate Energy and Natural Resources Committee. The purpose of today's hearing is to receive testimony on S. 2684 which authorizes a study of methods to protect and interpret the nationally significanty fossil trackways in the Robledo Mountains near Las Cruces.

I want to thank Senator Bumpers, Chairman of the Subcommittee on Public Lands, Natural Parks and Forests of the Senate Energy and National Resources Committee, for scheduling today's hearing. I am pleased that we are able to hold this hearing in Las Crucs. I think this hearing will give the citizens of Southern New Mexico

an excellent opportunity to learn about an impressive natural resource in this part of the state.

Fossils provide a critical link to the past and allow scientists to explore the planet as it existed milions of years ago. Although fossils can be found around the world, only a few sites contain information which the scientific community considers signifiant. One such site is the focus of our hearing today.

The significance of this find are the spectacular fossilized trackways of amphibians, reptiles, arthopods and insects made 280 million years ago. The trackways are unique in length and include prints of animals previously known. This discovery has the attention of the scientific community which has confirmed the significance of the discovery, espcially in light of the recent discovery of animal bones in the area.

Trackways are fossilized foot-hand prints which preserve a record of the activity of an animal during a portion of its life. Trackways reveal information on how the animal walked, length of their limbs, and the animals feeding and social habits.

The trackways are also an important eduction tool. They provide a dramatic illustration of animal and plant life which once existed on earth. Standing where an animal twelve feet long and weighing 600 pounds onced walked is enough to stir the imagination in anyone, especially children. Allowing children to see fossils can only increase their interest in science and desire to learn more.

This legislation would direct the Secretary of the Interior to conduct a study of the fossil trackways to: determine the importance of the discovery; evaluate how to curate, display an interpret the fossils found in the area; and, recommend the proper administrative designation and Agency for management of the site.

The legislation also would provide for an interim withdrawal that will extend for two years after the conclusion of the study. This will assure that the area is protected until Congress can determine what permanent protection actions would be appropriate.

STATEMENT OF SENATOR JEFF BINGAMAN
SUBCOMMITTEE ON PUBLIC LANDS, NATIONAL PARKS AND FORESTS OF THE SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
Page 4

Senator Domenici is a cosponsor of this legislation and similar legislation has been introduced in the House of Representatives by Congressman Skeen.

I iook forward to the testimony of our distinguished witnesses.

Before proceeding to our witnesses, there are a few administrative matters tht must be discussed We have four panels of witnesses to present testimony today. I ask each witness to limit their remarks to three to five minutes, in order to allow time for questions. Please feel free to summarize your statement and submit the complete text of your statement for the offical record.

The official hearing record will remain open until July 23 if anyone wishes to make additional comments for the record.

We will now proceed to our first witness.

II

101ST CONGRESS
2D SESSION

S. 2684

To authorize a study of methods to protect and interpret the nationally significant fossil trackways found in the Robledo Mountains near Las Cruces, New Mexico.

IN THE SENATE OF THE UNITED STATES

MAY 24 (legislative day, APRIL 18), 1990

Mr. BINGAMAN (for himself and Mr. DOMENICI) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

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A BILL

To authorize a study of methods to protect and interpret the nationally significant fossil trackways found in the Robledo Mountains near Las Cruces, New Mexico.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Prehistoric Trackways Study Act of 1990".

SEC. 2. FINDINGS AND PURPOSES.

(a) FINDINGS.—The Congress finds that—

(1) fossils are important for scientific studies of prehistoric life on earth;

(2) lands administered by the Bureau of Land Management in the Robledo Mountains in New Mexico contain one of the most important fossil discoveries of the 20th century;

(3) discoveries have included prehistoric tracks of amphibians, reptiles, arthropods, and insects; extensive plant fossils; and clues to the weather and climate of the period;

(4) fossil footprints that form trackways help scientists recreate the environment and habitat that supported prehistoric life;

(5) nearly 100 trackways from the Permian Age have been uncovered in the Robledo Mountains;

(6) the trackways are over 280,000,000 years old, and they document the emergence of life from water to land;

(7) the trackways are unique in length and represent most taxonomic groups, including many prints of previously unknown animals;

(8) the trackways and other fossils are being lost for scientific study through unsupervised collecting and commercial quarrying; and

(9) the trackways and fossils found in the Robledo Mountains and surrounding areas should be evaluated

for their potential protection and value for scientific interpretation and education.

(b) PURPOSES.—The purposes of this Act are—

(1) to require that a study be conducted to consider appropriate means to protect the discoveries and identify the scientific, interpretive, and public education values associated with these fossils; and

(2) to provide for interim protection of the fossils.

SEC. 3. INTERIM WITHDRAWAL OF THE SENDEROS PREHISTORICOS PROTECTION AREA.

(a) WITHDRAWAL.—The area of important discoveries, consisting of approximately 40 acres, as depicted on the map described in subsection (b), are withdrawn from the operation of public land laws except for mineral leasing for not to exceed 2 years after conclusion of the study.

(b) MAP.—The withdrawal area is depicted on the map entitled "Prehistoric Trackways Protection Area", numbered and dated 1990, which shall be on file and available for public inspection in the New Mexico State Office of the Bureau of Land Management.

SEC. 4. STUDY AND REPORT.

(a) STUDY.—The Secretary of Interior, in cooperation with State and local governments and institutions of higher education, shall conduct a study of the alternatives for the

protection and interpretation of the fossil resources of the Robledo Mountains.

(b) REPORT.—Not later than 1 year after the date that funds are made available for the study required by subsection (a), the Secretary of Interior shall transmit the study to the Committee on Energy and Natural Resources of the Senate and the Committee on Interior and Insular Affairs of the House of Representatives.

(c) CONTENTS OF STUDY.—(1) The study required by subsection (a) shall include an analysis of the importance of the discoveries at the site and an evaluation of the feasibility of developing a facility in New Mexico that would evaluate, curate, display, and interpret a portion of the fossils found in the area.

(2) The study required by subsection (a) shall recommend the proper administrative designation for the area and the agency that should be designated to manage the area.

SEC. 5. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated such sums as are necessary to carry out this Act.

○

Senator BINGAMAN. Before proceeding to the witnesses, there are a few administrative matters that need to be discussed. We have four panels of witnesses who will be presenting testimony today, and I have asked each witness to limit their remarks to 3 to 5 minutes.

Jerry MacDonald, who is the first witness, will take longer, since he is the discoverer of these tracks and is going to give us an overview of what he has discovered and the significance of it as he sees it, and the potential that he sees there. But I would like all other witnesses, if they could, to summarize their statements.

I will include full statements of any witness in the record, and we will leave the official record of this hearing open until July 23, if anyone wishes to provide additional comments to us in writing.

At this point, let us proceed to the first witness, and that is Mr. Jerry P. MacDonald, who is a Ph.D. candidate at the University of Virginia. He is the discoverer and the field director of the Smithsonian-based Paleozoic Trackways Project here in Las Cruces, and he deserves credit for us being here today. And he was just kind enough to show us the trackway project and give us a tour of it just an hour or so ago. We appreciate that very much.

But, Jerry, why don't you go ahead and indicate to us your view of this matter.

STATEMENT OF JERRY PAUL MacDONALD, FIELD DIRECTOR, PALEOZOIC TRACKWAYS PROJECT, SMITHSONIAN INSTITUTION

Mr. MACDONALD. Thank you. Could we have the lights reduced a little bit?

First, before I get started, I wanted to introduce my three project assistants. And the first one is Mark Schult from Indiana University, and he has been working with me for a few weeks here this summer and will be out again next summer for some continuing research. And Gary Chapman, in the back, has been a helper on and off for a year and a half, and because of his back problem, which I do not think is related to him working at the site, he has been more of a consultant for the last couple of months.

And Doug Wood, there, who is in every sense of the word absolutely invaluable to me as an assistant. He has probably given 42 weekends to scoping out some of the areas and was very instrumental in finding the new outcrop that we eventually found a bone in.

And I do not think my family is here.

Mrs. MACDONALD. No, we are.

Mr. MACDONALD. I have to introduce them, and especially my son, Noah—Is he around? Noah, raise your hand—because he did some of the diagrams of the animals that you will see in this particular display.

I have a prepared statement to read and hopefully these slides will go on fairly good with it.

It is now almost exactly 3 years ago since the discovery of the Robledo Mountains footprints and almost 2 years since the press conference announcement. The fact that prehistoric footprints occurred in some areas of Robledo Mountains has been known for a considerable period of time. I believe that even some of the mem-

bers of this audience have mentioned the occurrence in some of their research papers, even as far back as 1963.

But that is not the record notation for a New Mexico trackway occurrence, however. Dr. Martin Lockley, a noted trackway specialist from the University of Colorado at Denver, recently sent me a notation found in a German scientific journal by Dr. K.C. von Leonhard and Dr. H.G. Bronn, both faculty at the University of Heidelberg in Germany, and they mentioned the discovery of Paleozoic tracks in Oiva, New Mexico, back in 1840.

In point of fact, this reference is the oldest report of predinosaur footprints in North America, and only losing by 4 years to the classic description of dinosaur tracks by the Reverend Edward Hitchcock in 1836 in the now world-famous Connecticut Valley fossil assemblage. And the New Mexico report is only 16 years later than the first printed reference to footprints ever in Scotland in 1824 in the now famous New Red Sandstone. Those footprints are close in age to the Robledo footprints, being around 300 million years before the present.

I think it is fitting to see the attention New Mexico's trackways received exactly 150 years ago in Europe. I believe these hearings continue the rich tradition New Mexico has enjoyed in terms of its incredible natural resources.

I would like to give an executive summary of what we have found.

In barren arroyos 5 miles from Las Cruces, New Mexico's second largest city, an incredible array of fossil footprints were discovered that are over 280 million years old. These footprints are among the oldest in the world and document in exciting detail the dramatic emergence of life from the primitive prehistoric seas to the land. The quality of the footprints is excellent, as if they were made yesterday. Such perfect preservation is totally unique for tracks this old and provides the best opportunity yet for understanding what is probably the most important and exciting time in the history of life on earth.

In addition to the marvelous quality of the prints, the variety of animal trails preserved is astonishing. Nearly every major taxonomic group is represented by clear and extensive tracks, as well as many prints of previously unknown animals. Footprints of giant amphibians long extinct, as well as ferocious carnivorous reptiles are now being uncovered 2 miles west of the Rio Grande River in the Mesilla Valley of New Mexico. Many of the trails continue into the mountainside for an unknown distance.

For the first time, extensive trackways have been excavated that are more than twice as long as any previously reported, and the potential for even longer trails has scientists around the world buzzing with excitement. The research potential of the deposit is glorious since scientists can now clearly recreate the environment and habitat that supported these little-known ancestral creatures.

In addition to the numerous reptile and amphibian tracks uncovered so far, tracks and trails have also been excavated of insects scientists know very little about. Amazing trackways of primitive scorpions, giant centipedes and millipedes, horseshoe crabs, flying insects and an assortment of crawling bugs and beetles have been collected that have astonished scientists. Many of the insect track-

ways also show the prints of larger insectivores hunting them down. Many insect trails end under the heavy print of a reptile's foot.

I want to just point out here, this probably is an honest-to-goodness, no-doubt-about-it confrontation between two amphibians over a centipede, and that little black arrow up there in the right corner is the centipede trackway, which terminates in the middle of that mess.

Taken in total, all of the trackways preserve the daily wanderings of these animals and include the chance encounters with other creatures in the area. Every detail of these primitive animals' habits are preserved in stone. Even the weather has been fossilized, as 280-million-year-old raindrops are often seen dotting the surface of the layers. Mud cracks and ripple marks from wind and shore are also preserved.

The picture is completed with the discovery of extensive plant fossils within the trackway layers. Branches from primitive conifers and cycads nearly 50 feet tall have been uncovered along with the delicate leaves and stems of numerous seed ferns and plants, some previously unknown.

Major U.S. museums are now involved in the discovery, including the Smithsonian Institution, the Carnegie Museum in Pittsburgh and the Los Angeles County Museum of Natural History. Additionally, the world's foremost experts on the Lower Permian era are involved in the study and analysis of the tracks, as well as the area yielding the prints.

I would like to now give a brief history of how this was found.

Armed with numerous leads and maps, I set out to the mountains to search for the mother lode. Five weeks of digging in and around several hillsides in the Robledos produced only materials similar in quality and variety to what all my former collectors had found, that is, until June 6, 1987. That day's discovery is the reason we are all here this morning.

That morning I pulled out from a hillside a 4-foot-long slab of stone about 8 inches thick. I split the slab across that bedding plane and this is what I found: five perfectly preserved prints of a big reptile-like animal, and I had both the mold and the cast. Each print was over 7 inches long, much bigger than anything found before.

Here on one slab was the trackway preserving the fall of all four of an animal's feet plus the all-important second fall of one of its feet. Stride length and gait, as well as the locations of the shoulder and hip joints, could be easily calculated.

The conclusion was obvious. I had found a long trackway of what appeared to be a giant reptile. This did not belong in someone's personal collection or as a part of a fireplace or floor or part of an exterior wall like so much prior material from the Robledos had ended up. This was of world-class significance.

But I knew I had to start at the top layer and work my way down to the trackway. By starting at the top, I postponed the discovery of the rest of the big trackway by 19 months. I need to stress this fact. It was incredibly difficult for me to delay the discovery for that long, but the rigors of science demanded it, and I had to yield.

But you all have now seen the fruit of my restraint, for in those 19 months covering the systematic excavation of all of the layers above the trackway, I filled a 1,500-square-foot warehouse full of the tracks and trackways of over 50 separate vertebrate species until I finally got to layer 10.

When I finally reached that layer, it was beyond my wildest dreams. For there on layer 10 were the three longest Pelycosaur trackways in the world. The discovery slab was part of a 25-foot trackway of two converging reptiles. To the south of that trackway was the 20-foot trackway of another giant reptile and to the north was a 12-foot trackway of yet another reptile, all three trackways coming from one layer only 50 feet long.

If you just compare those three trackways from layer 10 to the accumulated history of Robledo tracks in the last 50 years, you see the astonishment and disbelief generated by news of this discovery. No matter how kind I am to earlier researchers, no matter how conciliatory I am to the accumulated history of the area, no matter how much I minimize my own work, the fact still remains that I did find the mother lode and no one else found it or even believed that it was there.

Another discovery took place on June 6, 1987, that explains why my Robledo research became so phenomenal. A thin film of dust was found in between the discovery slab I just split. Its width is no more than 1/32nd of an inch. I have now come to view this super thin film as the most crucial layer from the excavation, and I affectionately call it "God's Saran Wrap," for that tiny layer served to protect the trackway surface from bonding with overwash that came into the area a short time after the tracks were made. This film is the real miracle of the Robledo trackway deposit for without it, there would have been no discovery.

Now, in summary, I want to explain why this discovery is unique and what all the hoopla is about.

The discovery can be broken down into several interrelated pieces. First of all, the material collected through reconnaissance work from February 1987 through December of that year was of a quality surpassing anything collected before. The obvious variety and the taxonomy was also unique. The fine collection of invertebrate trackways as well as large sequences with big tracks from a variety of different animals were unparalleled.

Additionally, the material was fresh with no evidence of erosionary processes to diminish that clarity. In fact, the preservation was so perfect that it was impossible to imagine preservation getting any better. And most importantly, it was material that could be placed back in situ, a key and fundamental difference between the new work and prior collecting.

Furthermore, there were numerous replicative trackways found in a variety of sediments from sandstones, siltstones, mudstones and shales. And the quantity of trackways was virtually inexhaustible. Nearly every slab in situ had evidence of life.

Secondly, the extent of the deposit was never explored before. Although there were several trackway outcrops, all of the material basically that was found was found as debris. And there was no systematic excavation of any of the outcrops. Therefore, it was not known how extensive the track-bearing beds were as no attempt

was made to remove the overburden and explore the layers. When layers were analyzed in situ, it was for sedimentological or stratigraphical work, not for paleontological research.

Thirdly, the trackway material was woefully misdiagnosed. The most obvious reason for this was the fact that hardly any material was available to evaluate in the first place. The small amount of material that was collected was never sent off for an evaluation by experts versed in Permian taxonomy, history and trackway analysis. Only such experts could accurately evaluate the significance of the material.

Why the material was correctly diagnosed now can be attributed simply to the fact that I had already amassed an imposing collection of good material through months of reconnaissance work in which I sampled 20 successive layers in 9 different sites. I brought a wealth of material and photographs to both the Smithsonian Institution and the Carnegie Museum of Natural History because they had specific research expertise in Permian vertebrate paleobiology.

Both Nicholas Hotton of the Smithsonian's department of paleobiology and David Berman of the Carnegie Museum are considered two of North America's foremost experts in the field. Additionally, the good variety of material could be easily compared to the standard trackway site in the world, the Gilmore collection of Permian trackways from the Coconino sandstone from the Grand Canyon and now permanently housed at the Smithsonian Institute.

Related to the misdiagnosis was a complement of inaccuracies surrounding the trackways. The age of the material was incorrectly promoted as middle to late Permian, up to 50 million years too young. There was a printed bias that the tracks could never be properly identified either due to poor quality or to a lack of supportive research.

The depositional environment was incorrectly assumed to be primarily dune. It was not until 1985 that the ancient environment was attributed to tidal flat. This new information was key in showing why the trackway material was so perfectly preserved and so extensive. Additionally, there was the widespread belief that the material was too difficult to get to, almost impossible to split, and that the outcrops were so far away from motorized vehicle that no one dared the problematical excavation. Yet the new research material proved that the trackways could be identified and followed for a considerable distance, sometimes for 40 feet for more.

And the species list was phenomenal: five subclasses of vertebrates, three among the reptiles and two among the amphibians alone, breaking down into 11 distinct orders, and then there were numerous families and countless species. And then there were the invertebrate trackways. One could only guess at the number of various arthropods and insects that were preserved from the site. By the fall of 1989 there were over 50 separate species of invertebrate and vertebrate animals represented, as well as several species of plant. Yet even more exciting than the amazing diversity of animal life was the fact that many of these animals—the Carnegie Museum estimates that perhaps half of the census—are new, undiscovered species.

Now great attention has been drawn to the area because of material congruent with such stellar interests. Scientists from the Smithsonian and the Carnegie Museum in Pittsburgh have made special trips to the Robledo excavation on a number of occasions, and museums and academic institutions began laying the groundwork for further systematic research. Major reports on the trackways have been written up by the American Geological Institute, the National Geographic Society and numerous other organizations.

Scientific articles have appeared in the American journals Geotimes and Earth Science, the British journal Nature, the Canadian journal Geolog, as well as National Geographic and Science World. Grants for research have been secured from the Carnegie Institute, the Los Angeles County Natural History Museum, the Smithsonian Institution and the New Mexico Commission on Higher Education.

I want to briefly mention the discovery of bone. On June 16, Doug Wood, one of my assistants, was with Mark Schult and I on our first attempt to find bone in the area, and I had a good lead. When Nicholas Hotton was here about 4 weeks ago, he found an outcrop that appeared to contain some bone, but the bone was very badly broken up and it was in a lens that was buried in the arroyo floor, so virtually impossible to really verify. But at least I had a lead as to what kind of outcrops to look for.

Well, on June 16, Doug Wood was going to take us to a canyon that he had found some new tracks and plants, and we took a shortcut down another small canyon and I spied an outcrop like the one that Nicholas Hotton had pointed out earlier to us, and the bones were laying right on the top. It was an ancient stream channel. And we do not know how rich the stream channel is as of yet, but it may be very rich. It may not be. Further work has to be done in that regard.

I wanted to mention one other thing, and that is what this has done to me—Well, let us first look at some of the tracks from the new area. This is some of the material as it looks in the layers from the new deposit. And these are some of the tracks that we have just found, very spectacular. You can see the tail drag going down the middle. You can see the very, very dainty lagoonal water ripples there.

I think you can see how dramatically different the material is at the new site as compared to the old site. Just spectacular evidence. I do not know if you can see it, but there is a little tiny bug trail right in the center. He does a big doughnut and then he goes back over there and then he goes back the way he came.

These are other insect trackways from the new deposit. Some of the animals. The animals appear to be quite different in a number of ways to the animals we are finding in the Robledos and should be a new challenge to us in our correlation of the tidal flat area to the dune area. This is, to me, probably the most spectacular trackway I have. It is only five inches long but it is just absolutely incredible. I could never have dreamed up something like that.

In the summer of 1988, the excavation was at full speed; 1988 was mainly spent marking out the parameters of the main excavation, removing the overburden and also in investigating other outcrops in the Robledos for tracks and trails. By the end of 1988, I

had found 14 other track-bearing outcrops and three of them appeared to be even richer than the AF 2 site. The new deposit is also just as rich. I am not sure about how much lateral continuity we can get of the beds in the new deposit, but it is certainly very valuable in terms of the continuation of a catalog of animals that we found in the area.

We can best characterize 1989 as the year of the mule, as I hauled out on my back over 20 tons of material the equivalent of 150 miles. Included in this weight were the three long trackways from layer 10. In the 2 years I have rearranged over 60 tons of rock all by myself.

The physical toll on my body was and is still great. I have a torn rotator cuff in my shoulder. I have nerve damage in my right heel. I have torn cartilage in my right thigh. I have a large cyst in my right ankle, which emerged after a bad sprain. I have constant bruises on my shoulders and neck from the straps of my backpack, to say nothing of smashed fingers, periodic heatstroke and the worst menace of all, swarms of black flies. Also a constant problem is scorpions, centipedes and rattlesnakes.

The psychological toll has been even greater, the result of battling constant criticism from local academics concerning the quality of my work and the significance of my finds. But it has hardened me into a healthier human being. I have had to draw strength from a great sense of inner satisfaction knowing that what I was and am doing still is extremely important. I love my work, I love what I have found and I am proud to present it to you all this morning.

Thank you.

[The prepared statement of Mr. MacDonald follows:]

101st CONGRESS 2D Session

SENATE BILL S.2684

FIELD HEARINGS
"Prehistoric Trackways Study Act of 1990"

JULY 6, 1990
LAS CRUCES, NEW MEXICO

Public Testimony

Jerry Paul MacDonald

Field Director
Paleozoic Trackways Project
Smithsonian Institution

EXECUTIVE SUMMARY

In barren arroyos five miles from Las Cruces, New Mexico's second largest city, an incredible array of fossil footprints were discovered that are over 280 million years old. These footprints are among the oldest in the world, and document in exciting detail the dramatic emergence of life from the primitive prehistoric seas to the land. The quality of the footprints is excellent --, as if they were made yesterday.. Such perfect preservation is totally unique for tracks this old, and provide the best opportunity yet for understanding what is probably the most important and exciting time in the history of life on earth.

In addition to the marvelous quality of the prints, the variety of animal trails preserved is astonishing. Nearly every major taxonomic group is represented with clear and extensive tracks, as well as many prints of previously unknown animals. Footprints of giant amphibians long extinct, as well as ferocious carnivorous reptiles are now being uncovered at the base of a 300 foot mountain two miles west of the Rio Grande river in the Mesilla Valley of New Mexico. Many of the trails continue into the mountainside for an unknown distance.

For the first time, extensive trackways have been excavated that are more than twice as long as any previously reported, and the potential for even longer trails has scientists around the world buzzing with excitement. The research potential of the deposit is "glorious", since scientists can now clearly recreate the environment and habitat that supported these little known

ancestral creatures.

In addition to the numerous reptile and amphibian tracks uncovered so far, tracks and trails have also been excavated of insects scientists know "virtually nothing" about. Amazing trackways of primitive scorpions, giant centipedes and millipedes, horseshoe crabs, flying insects, and an assortment of crawling bugs and beetles have been collected that have astonished scientists. Many of the insect trackways also show the prints of larger insectivores hunting them down. Many insect trails end under the heavy print of a reptile's foot.

Taken in total, all of the trackways preserve the daily wanderings of these animals, and include the chance encounters with other creatures in the area. Every detail of these primitive animals' habits are preserved in stone. Even the weather has been fossilized, as 280 million-year-old raindrops are often seen dotting the surface of the layers. Mud cracks and ripple marks from wind and shore are also preserved.

The total picture is completed with the discovery of extensive plant fossils within the trackway layers. Branches from primitive conifers and cycads nearly 50 feet tall have been uncovered, along with the delicate leaves and stems of numerous seed ferns and plants, some previously unknown. The deposit has been compared by it's discoverer to finding a complete edition of an 280 million-year-old encyclopedia set, with none of it's volumes missing, and no pages torn out.

Major U.S. museums are now involved in the discovery, including the Smithsonian Institution, the Carnegie Museum in

Pittsburgh, and the Los Angeles County Museum of Natural History. Additionally, the world's foremost experts on the Lower Permian era are involved in the study and analysis of the tracks as well as the area yielding the prints.

INTRODUCTION

[1.1]

It is now almost exactly three years since the discovery of the Robledo Mountains footprints, and almost two years since the press conference announcement of that discovery chaired by Nicholas Hotton of the Smithsonian Institution and David Berman of the Carnegie Museum.

[1.2]

The first order of business that I would like to undertake this morning is to acquaint many of you with the events that occurred in the Spring of 1987 which led up to the discovery and which has now culminated in this senate hearing.

[1.3]

The fact that prehistoric footprints occurred in some areas of the Robledo Mountains had been known for a considerable period of time. I believe that some of the members of this audience have mentioned the occurrence in some of your research papers, even as far back as 1963.

[1.4]

But that is not the record notation for a New Mexico trackway occurrence, however. Dr. Martin Lockley, noted trackway specialist from the University of Colorado at Denver, recently sent me a notation found in a German scientific journal by Dr. K.C. von Leonhard and Dr. H.G. Bronn, both faculty at the University of Heildelberg, Germany, mentioning the discovery Paleozoic tracks in Oiva, New Mexico --, published in 1840!

[1.5]

In point of fact, this reference is the oldest report of pre-dinosaur footprints in North America, and only losing by four years to the classic description of Dinosaur tracks by the Reverend Edward Hitchcock in 1836 in the now world famous Connecticut Valley fossil assemblage. And the New Mexico report is only 16 years later than the first printed reference to footprints ever, in Scotland in 1824 in the now famous New Red Sandstone. Those footprints are close in age to the Robledo footprints, being around 300 million years before the present.

[2.1]

I think it is fitting to see the attention New Mexico's trackways received exactly 150 years ago in Europe. I believe these hearings continue the rich tradition New Mexico has enjoyed in terms of its incredible natural resources. I will also argue that the Robledo trackway assemblage is even more worthy of international attention now as in the first decades of the 19th century, and so indeed have they been reported throughout the world in the last two years since the announcement of the discovery.

[2.2]

Oh yes, I'm sure you are wondering where Oiva New Mexico is, and the rest of the story. Well, the trouble is that New Mexico, back in 1840, was three times as large as it is today. In 1840, New Mexico also encompassed a large part of west Texas, Southern Coloradc, nearly half of Arizona, and part of Utah! Dr. Lockley didn't know this, so he told me to give credit to Lockley's student **when**, not "if", I found it. I think I will leave this discovery to one of the young honor students in the audience.

COLLECTION HISTORY OF THE ROBLEDO MOUNTAINS, NEW MEXICO

[2.3]

As I said a few minutes ago, the fact that the Robledo's occasionally yielded small tracks and plants was common knowledge to fossil collectors, hikers, quarrymen, faculty members from New Mexico, and former students of earth science at New Mexico State University, of which I am included. Consequently, I utilized the recollections of many individuals, both verbally and in the printed word. I personally planned out a search for tracks based upon this information. But yet it is no secret that I wanted to find "the motherlode" of tracks.

[2.4]

Not only were there little notations and footnotes about Robledo track debris, but there was considerable prior opinion, mostly verbal, but some written, concerning the Robledo footprints. Obviously, these opinions were all based upon great knowledge of the mountains, primarily from sedimentological research and from mapping the region. And it was almost all accurate, based upon the work that had been done. I would like to mention some of these beliefs to you now, because the backdrop of prior history of the Robledo Mountain tracks will serve to highlight the incredible

nature of the discovery. I think this background will instill in you the sense of astonishment we all felt when the magnitude of the discovery was initially realized from the now famous evaluation of the Robledo material from the Smithsonian Institution in December, 1987.

[3.1]

All of the opinions prior to 1987 covering the Robledo tracks are based upon what I call "collection history". A "Collection history" can be understood in the following way: Information about the productivity of an area is always based in part upon the accumulated history of the work done and the material collected in that area.

[3.2]

The material that has been collected before 1987 in the Robledo's show that in nearly every case, the tracks that were found were approximately 1/4 to 1/2 inch in length. If trackways were found - trackways meaning several consecutive footprints, they were almost always of short length. Three such examples can be seen in a display case out in the hall at Breland, where the NMSU Earth Science Dept. is based. The only reported exception is a four inch track on exhibit in the New Mexico Museum of Natural History, collected as debris in I believe 1980.

[3.3]

And this leads me to the next point. The collection history also tells us the following: nearly all the material was collected as debris, with no knowledge of exactly what layer the specimen(s) came from. And even here we are assuming too much. We are assuming some significant lateral continuity of the beds themselves- that the layers were still basically intact. Such an assumption is contradicted by visual inspection of some of the outcrops. Some of the outcrops are nothing more than jumbled piles of rock or at best, badly slumping layers broken and weathered into indistinguishable units. And at the other extreme, some of the outcrops are inpenetrible layers of cemented sediment in the form of cliffs 50 to 100 feet high with no toe-hold with which to get a sample.

[3.4]

Connected with these facts was the accumulated history concerning quality and diversity. The quality was almost always poor, mainly because the specimens lay exposed and broken on the hillsides for years and years until someone had the good fortune to see them. Coupled with this is the fact that what I would describe as the "brilliance" of the material was ground away by years of exposure,

leaving a poorly preserved example of a print that often masked its "anatomical" uniqueness.

[4.1]

The collection history of the area also involves the amount of activity the area has seen. The fact that all the tracks were small and the trackways of short length, as well as their poor quality and their unknown specific origin may not be that significant if only a handful of people worked in the area in the last fifty years. Such was not the case in the Robledos. There is no question that the area is well known stratigraphically, sedimentologically, and in terms of the marine life the area supported- for in every case, careful studies and replicative endeavors have occurred in the Robledos for decades, not to mention the fact that the area is still the field school of the earth science department at NMSU in the training of stratigraphers and sedimentologists.

[4.2]

Finally, the collection history involves the number of professional reports covering the area, describing the material, and outlining trackway outcrops. Outside of a short description in the 1980 collectors magazine ROCKS and MINERALS, there was virtually nothing devoted to the tracks to be found anywhere.

[4.3]

This dearth of printed information could mean two things: Firstly, there was nothing devoted to the tracks because they were considered unimportant scientifically, and/or secondly, the fact that there was never a sizable collection to describe in the first place. Three badly weathered slabs with a few small prints doesn't command much attention among professionals. In this regard was the fact that the tracks were never brought to the attention of qualified trackway specialists, and vertebrate paleontologists specialized in the Permian.

[4.4]

The collection history, encompassing all of this information, is also related through time as well. If all this opinion was amassed in a year or two, the test of time from replicative studies could prove the short-lived history to be inadequate. Again, this was not the case, as I have been able to trace concentrated activity in the area for nearly one-half century.

[5.1]

Finally, the collection history of the area needs to be related to other similar areas for comparison. The fact of the matter was that there were much better footprint collecting areas in west Texas, in the Grand Canyon of Arizona, and southern Colorado, as well as marvelous spots in Kansas, Mississippi, and Nova Scotia.

[5.2]

Related to this were the following facts: The Robledo tracks were Lower Permian in age, -- 280 million years old, and as such, subject to unforgiving erosion and weathering, and the countless spasms of eons of tectonic activity. Anyone who has walked the Robledos can see the violence that nature has done to the area. To even think, let alone suggest, however meekly, that one could get a perfect 20 foot long trackway section to study or worse, to think that perhaps that 20 foot section could contain sporadic evidence of life vertically through several layers was to fly in the face of common sense.

[5.3]

Additionally, it was printed that the layers were impossible to split at the same horizon for any significant length at all, so even if one knew there were tracks in a long section of sandstone, one could never expect to expose the whole layer. It was also printed that the trackmakers could never be identified, and so all of the tracks were therefore lumped together into the general categories of amphibians and reptiles, specifically with the latter -- "Lacertoids", lizards, if you will.

[5.4]

All of these accumulated facts helped formulate a diagnosis concerning the importance and extent of the Robledo footprints. And unfortunately, the diagnosis was woefully inaccurate.

FINDING THE "MOTHERLODE"

[5.5]

Armed with numerous leads and maps, and even a couple of track-bearing outcrops pinpointed by earlier individuals, I set out to the mountains to search for the motherlode. Five weeks of digging in and around several hillsides in the Robledos produced only material similar in quality and variety to what all my former collectors had found, -- that is, until June 6th, 1987. That day's discovery is the reason we are all here this morning.

[6.1]

I am also very certain that my search would have ended by the end of that week, for my work seemed to be an exercise in futility, it's only value being to reinforce fifty years of prior work in the area. For in those five weeks, I found that the material **was** hard to follow laterally, and that the big slabs on the hillside **were** basically impossible to split. Most of the material **was** badly weathered. And there appeared to be no way to correlate the debris into a layer in situ.

[6.2]

But everything changed on June 6. That morning I pulled out from a hillside a 4 foot-long slab of sandstone about 8 inches thick. I turned it on it's longest side and saw a very prominent horizon line going lengthwise through the slab. I split the slab across that bedding plane. And this is what I found --, five perfectly preserved prints of a big reptile-like animal, and I had both the mold and the cast. Each print was over 7 inches long, much bigger than anything found before. Here, on one slab, was a trackway preserving the fall of all four of the animals feet plus the all-important second fall of one of it's feet. Stride length and gait as well as the locations of the shoulder and hip joints could be easily calculated.

[6.3]

It did not take an expert to realize that this layer, which I had exposed for only a few feet, proceeded up the length of the hillside for at least 200 more. If you were as Idealistic as I was then, the conclusion was obvious--, I had found a long trackway of what appeared to be a giant reptile. All I had to do was follow the bed, remove the overburden and any rock above it, and split the slabs.

[6.4]

That may have been how others would have done it, but not me. When I saw this slab I knew my search was over, and that my life had changed. This did not belong in someone's personal collection, or a part of a fireplace or floor, or part of an exterior wall, like so much prior material had ended up. This was of world-class significance.

[6.5]

In my mind everything that I had done now had to change dramatically. Everything now had to be documented. Everything I now did had to be undertaken with extreme caution. I could no longer indiscriminately pull out specimens from the hills. I

[7.1]

realized that I had to start at the top layer and work down, carefully removing every layer until I reached the layer containing what I thought was the big trackway. I began by having an NMSU professor, Thom Votaw, video-tape the way the hill looked before I did any more work. And I then went out and bought $1,000.00 dollars of camera equipment, and I began to take pictures of everything.

[7.2]

By starting at the top, I postponed the discovery of the rest of that big trackway by 19 months. I need to stress this fact. It was incredibly hard for me to delay my discovery for that long, but the rigors of science demanded it, and I had to yield. But you all have now seen the fruit of my restraint, for in those 19 months, covering the systematic excavation of all the layers above the trackway, I filled a 1,500 square-foot warehouse full of the tracks and trackways of over 50 separate vertebrate species.

[7.3]

When I finally excavated down to the trackway, now known as layer ten, what I found was beyond my widest dreams. My expectations bloomed into the flower of discovery realized, an intense satisfaction of a job well done filled my heart. For there, on layer ten, were the three longest Pelycosaur trackways in the world. The discovery slab was part of a twenty-five foot trackway of two converging reptiles. To the south of that trackway was the twenty-foot trackway of another giant reptile, and to the north was the twelve-foot trackway of yet another reptile. All three trackways coming from an exposed layer only fifty feet long!

[7.4]

If you just compare those three trackways from layer 10 to the accumulated history of the Robledo tracks from the last fifty years, you see the astonishment and disbelief generated by news of this discovery. No matter how kind I am to earlier researchers, no matter how conciliatory I am to the accumulated history of the area, no matter how much I minimize my own work, the fact still remains that I did find the motherlode and no one else found it or even believed that it was there.

[7.5]

Another discovery took place on June 6, 1987 that explains why my Robledo research became so phenomenal. A thin film of dust was found in-between the discovery slab I just split. I remember pealing it off the tracks with my fingernail--, it's width no more

[8.1]

than 1/32 of an inch. I remember viewing it as a nasty inconvenience. I did not recognize or understand the great importance of that de-laminating layer for several months. I did not know that it was my most important ally.

[8.2]

I have now come to view that super thin film as the most crucial layer from the excavations, and I affectionately call it "God's saran wrap", for that tiny layer served to protect the trackway surface from bonding with the overwash mud that came into the area a short time after the tracks were made. This film is the real miracle of the Robledo trackway deposit, for without it, there would have been no discovery. My work would have reinforced a fifty-year-old bias.

[8.3]

When people found small slabs with tiny tracks, weathered for who knows how long, the "saran wrap" was long gone, easily washed away and dissolved by the first rain after exposure. The impression left when these small slabs were found was that without a de-laminating layer, splitting the layers in situ would be about the same as trying to separate two successive layers of concrete. Bigfoot could have walked across the first layer of concrete, forever proving it's existence, and yet we would never be able to split that horizon for any measurable distance because the concrete layers bonded to one another.

[8.4]

Local opinions of the discovery slab I removed was less than positive other than in terms of what I would call "private collection value." Undaunted, I took my recon material and the slab with me to the University of Virginia where I received a doctoral fellowship for my work in Sociology. The day I arrived I met with the faculty in my department, and that afternoon I called the Smithsonian Institution.

A DESCRIPTION OF THE SIGNIFICANCE OF THE ROBLEDO MOUNTAIN TRACKWAYS

Please refer to excerpts from the manuscript TRACKING NEW MEXICO'S PRE-DINOSAURS, enclosed with this testimony.

PERSONAL LABOR

[10.1]

In the summer of 1988 the excavation was at full speed. 1988 was mainly spent marking out the parameters of the main excavation, removing the overburden, and also in investigating other outcrops in the Robledo's for tracks and trails. By the end of 1988, I had found 14 other track-bearing outcrops, and three of them appeared even richer than the AF 2 site.

[10.2]

1989 can be best characterized as the year of the mule, as I hauled out on my back over 20 tons of material the equivalent of 150 miles. Included in this weight were the three long trackways from layer 10. In two years I had rearranged over 60 tons of rock --all by myself. The physical toll on my body was and is still great: a torn rotator cuff in my shoulder, nerve damage in my right heal, torn cartilage in my right knee, a large cyst in my right ankle, which emerged after a bad sprain, bruises on my shoulders and neck from the straps of my backpack. To say nothing of smashed fingers, periodic heat stroke, and the worst menace of all --, swarms of blackflies. Also a constant problem is scorpions, centipedes, and rattlesnakes.

[10.3]

The psychological toll has been even greater, the result of battling constant criticism from local academics concerning the quality of my work and the significance of my finds. But it has hardened me into a healthier human being. I have had to draw strength from a great sense of inner satisfaction, knowing that what I was and am still doing is extremely important. I love my work, I love what I've found, and I'm proud to present it to you all this morning.

SLIDE SHOW OF AF 2 EXCAVATION

[11.1]

I had debated whether to show you slides of the material that I have excavated from the beginning of the discovery, three years ago, until now. But I think the impact would be greater if I just showed you slides of the material that has been found in just the last six weeks.

SUGGESTIONS FOR THE STUDY, PRESERVATION, AND PUBLIC ACCESS TO THE ROBLEDO TRACKWAYS

[12.1]

It is my opinion, from working the trackway sites, now entering into the fourth full year, that the material within a three-square mile area, is of the same quality as the material in the main excavation site, called AF2. AF 13 in particular, is significantly larger than AF2 and very, very rich in tracks, plants, and insect trails. In fact, it was a toss-up as to which site I would devote my energies to.

[12.2]

The trackways in this small geographical region are exposed in 15 separate outcrops, varying in size from 30 feet, to nearly 1000 feet in length. Some are 8 to ten feet high, and others, like AF10 and AF 13 are one hundred or more feet high with maybe 500 major track-bearing layers.

[12.3]

It is my opinion, shared by both Dr. Berman of the Carnegie and Dr. Hotton of the Smithsonian, that the supply of tracks from this small area is virtually inexhaustible. The potential is there for several museums and academic institutions working many of these outcrops for decades and only scratching the surface.

[12.4]

With this in mind, it is obvious to me, from a purely research point of view, that the Robledo trackway area deserves a facility that could be used for study by a number of academic institutions and museums, both in this country and abroad. I have already been contacted by scientists from as faraway and diverse locations as England, Japan, and Australia, as a result of the article in the March issue of National Geographic. Such a facility should be near if not in the deposit area itself.

[12.5]

Secondly, from a view toward public education, such a facility should also contain exhibitions of local material in the following ways: through dioramas illustrating the various local environments surrounding the trackmakers -- such as the tidal flat, lagoonal, stream channel, and dune areas dotting the region 280 million years ago. It should also contain reconstructions of the numerous

[13.1]

animals that we have found the tracks of that are known, as well as educated reconstructions of the vast collection of new species that are unknown. There should be collections of the plant fauna, the insect and arthropod material, and the possible collections of bone from the area. And last but by no means least, the hallmark of the facility, exhibitions of the endless collections of trackways and trails themselves, which even now, can fill a 4,000 square foot facility in their own right.

[13.2]

In addition to this, I believe that a pavilion similar to the one found in Dinosaur National Monument is clearly warranted in this situation as well. Such a pavilion can be built around the mountain that sites AF1 and 2 are part of. It is my belief, based upon three years of comparative work with AF2 and the other 14 sites, that the best opportunity to expose vast layers of sediment containing numerous criss-crossing tracks and trails, is at the AF 2 site. The potential is there to have exposed several layers on the order of 200 x 50 to 100 feet wide. Those of you that visited my work at the AF 2 site this morning know how incredible such possibilities are in view of what I have exposed just on the outer edges of 25 layers.

[13.3]

I must stress to the committee that such a spectacular exposition is only possible through development of the on-site pavilion because the material itself is very fragile and can only last a few months once it is exposed to the various seasons it will be subjected to in the course of one year. I wish the case were otherwise but it is the sad fact.

[13.4]

Vast amounts of material have already been lost in just a few short years. The twenty foot trackway found on the lowest section of layer 10 of AF 2 was seriously damaged due to flash floods and rains which rushed over it in just the last four or five years. The lowest 6 feet of that trackway were in over 100 pieces that I had to carefully collect and re-cement back at the lab. I am certain that if any significant time at all continued without it's excavation, the big trackway would have only been 14 feet long instead of 20.

[13.5]

Such a pavilion should serve not only to protect layers exposed and then left in place, but also as a viewing platform for the public

as scientists continue work on the mountain, again, like Dinosaur National Monument.

[14.1]

Now on to the question of the official designation of the site. I understand that in-depth discussions of the national and international significance of the deposit will be presented in detail at the second part of the Senate hearings on Bill 2684 in Washington D.C. within the next two weeks, so I won't belabor the point now except to say that in terms of a national treasure I and the others associated with the project are convinced of it's irreplaceable importance.

[14.2]

Even if it was level in significance to the Grand Canyon trackways, it deserves at the very least the protection afforded the Coconino tracks of the Canyon through it's National Park status. Our advantage in the Robledo's, however, is the unique opportunity to expose vast stretches of track-bearing layers for research and public viewing. It would be foolhardy to expose such material without the highest stamp of significance and protection that the United States can bestow on one of it's national treasures. I cannot and will not expose such vast fossil assemblages if such authoritative protection is not afforded the area.

[14.3]

Also in this context is the need not only to protect the excavation from the destructive forces of nature, but also from the calloused work of looters and scavengers. The thought of major exposures of track-bearing sediment laying bare on the surface with no security what-so-ever except for a chained road give me and other scientists involved in the project the chills.

[14.4]

All of us here in New Mexico remember the anger and frustration we felt upon discovering that the best section of the 20 foot trackway from layer ten was stolen. Four large slabs, weighing in at 200 pounds, were removed. I thought they were permanently lost. The BLM deserves great honor in the way it handled the theft. They posted a $1000.00 reward for information regarding the theft. The newspapers as well deserve credit for the bold report of the theft. Fortunately, 15 hours after the posting of the reward the material was returned. There can be no question that we will not be so lucky in the future. We must protect the site from the schemes of looters and scavengers. At the very least a mobile building should be placed at the entrance to the area, manned by a volunteer from the BLM or other appropriate federal agency, during the year the

study is undertaken.

[15.1]

There has also been a dramatic increase in the number of unsupervised visits into the trackway deposit area, some even stumbling into the main excavation site. On-site security will aid in the control of these visits.

[15.2]

The potential for a museum and pavilion are, of course, entirely dependant upon some designation nationally for the area. I believe that additional appropriations should be added to existing funds to ensure the success of the one year study the congress is considering. During this time clear plans for the exploitation of the region can be developed and summarized for final consideration by the congress.

[15.3]

Further advantages unrelated to the significance of the deposit from a scientific point of view, is the fact that the deposit is only 5 miles from the second largest population center in New Mexico, to say nothing of the 1/2 million additional people from the El Paso, Texas area, only 50 miles away. Such close proximity of a major population center to a natural resource of this caliber seems to assure frequent visits from thousands of people a year, ensuring both an educational and economic return both to state and local governments in New Mexico, but to federal agencies as well.

[15.4]

Concerning overseeing the proposed study, it seems appropriate to continue using the Smithsonian Institution, and it's vast technical and professional resources, as the Federal base in the proposed research. Not only from a standpoint of Federal Authority, but in the fact that the world's foremost experts in the Natural history of the United States of America, and in particular the Permian period, are employed there, as well as the obvious involvement of the Smithsonian covering the first three years of the project.

[15.5]

As we now enter the forth year of research, the renewed Federal Excavation Permit, handled through the Federal Bureau of Land Management- New Mexico Office, is in the Smithsonians' name as being in charge of not only the process of excavation, but in the responsibility of curation of the material. Commitments have been made from day one to develop this natural resource at the site itself. Very little material will be taken out of the area, and to

this day, 99.9 percent of the material I have collected is still in the Las Cruces area.

[16.1]

Although I cannot guarantee that others after me will be as possessive of the material as I have been, I am committed, as the project field director, to continue, along with the Smithsonian Institution, to ensure that the material and facilities for study and educational exploitation remain in the immediate area.

Thank you for your kind attention. I am sure you share my enthusiasm for the development of this incredible natural resource.

Jerry Paul MacDonald

Field Director
Paleozoic Trackways Project
Smithsonian Institution

THE PRESS CONFERENCE
AUGUST 22, 1988

"We have called this press conference to announce what has been up to now one of the best keep secrets in the natural history of New Mexico. Within five miles of Las Cruces, the second largest city in New Mexico, one of the most important fossil discoveries of the twentieth century has taken place. The discovery took place over a year-and-a-half ago. During this time only a half-dozen men in the world knew of it's occurrence.

With all of the evaluations now secured as to it's level of significance, with the proper permits and forms filed, with a good representative sample of the specimens now excavated, and with recognized experts in the field relating to this discovery now present, it seemed appropriate to officially announce it at this time.

Jerry Paul MacDonald

Director-Paleozoic Trackways Project

"The specimens excavated so far are tremendously diversified. Nearly the whole spectrum of Lower Permian animals are represented. My field work in Texas and other places has led to the excavation of creatures like Dimetrodon and Edaphosaurus, among others that are represented with trackways from this deposit. But there are many other animals that will come to be known only from this site. Already Jerry has collected a tremendous amount of information about the invertebrates - insects and other creatures without a backbone, concerning which, for this time period, we know virtually nothing. Because of this, the research potential of the material from this spot is absolutely glorious -- it's very exciting."

Another point I would like to discuss is simply this: the material that paleontologists such as myself and Dave Berman of the Carnegie museum collect --bones, represent the dead animal. This may sound like a silly point but what paleontologists generally find there in the rocks is not evidence of how an animal lived but where it died, and we may not even know that for sure. But to see these footprints in these hardened layers, and to be standing on that spot -- you know that 270, 280 million years ago something else was standing on that spot, and you are right there.

Footprints tell us alot about how an animal lived, and as such are an extremely important part of what I consider the fun part of vertebrate paleontology, in any case the most productive part, which is trying to restore these animals and figure out how they worked, because they are quite different from anything we know of at the present time... There are so many differences that we need

every scrap of information that we can get to try to put them back together. Because of this the exploitation of the MacDonald trackway deposits will prove to be of great scientific value to the scientific community for a long time to come."

Nicholas Hotton III
Research Curator, Dept. of Paleobiology
Smithsonian Institution
Las Cruces Hilton

"I first learned of the trackway deposit when Nick Hotton called me in late 1987 with the news. Since then Jerry has brought to the Carnegie Museum samples of the material, as well as quite a number of photographs of the trackways. I am prepared to say that this is a very impressive and very significant collection. I believe that in terms of quality, quantity, and variety of Lower Permian trackways this is the greatest deposit of its kind found anywhere in the world. It surpasses anything that I have seen reported.

Deposits like this give researchers a greater sense of authority as to how many and what kinds of animals lived together at the same time and in the same region. I have been chasing vertebrate fossil skeletons from the Permian period through much of northern and central New Mexico and the surrounding areas now for nearly a quarter century, and I dare say the skeletons that we've found probably represent two or three different types of animals, it's often too difficult to tell exactly. But in any case it is surely far short of the great variety of animals represented by

these trackways that Jerry has found. Many of these animals will probably never be identified, and undoubtedly Jerry has uncovered the tracks of many new species as well.

This trackway discovery will allow researchers to work out the locomotor behaviors of these little-known animals--, whether they were sprawlers or semi-erect in their gait, their stride and length and posture can all be calculated now and this information will prove to be quite helpful in reconstructing the past.

Additionally, these various trackways represent in part a portion of the daily wanderings of these animals and so they should provide us with a great deal of information and clues as to these animals behaviors. The trackways of dinosaurs, for instance, have in some cases shown that dinosaurs were gregarious. Certainly with this discovery, conclusions like this are possible, since so many long trackways have been excavated so far... This information, coupled with the trackway records of chance encounters with other types of animals should provide us, once the deposit is fully excavated, with a great wealth of information about the life history of these animals.

I believe that it is crucial that I emphasize the importance of this deposit and urge that it be fully explored, that the specimens be carefully and thoroughly documented, and that eventually these collections end up in reputable and well recognized institutions of research. In this way the specimens will be carefully curated, preserved, and made accessible to research scientists. I believe this deposit has the potential of

being a very rich source of information to paleontologists, and this will be the case for many years to come."

David S. Berman
Curator of Vertebrate Fossils
Carnegie Museum of Natural History
Las Cruces Hilton

CHANGING THE DIAGNOSIS:
From Interesting Curiosities to "Discovery of the decade."

The initial material from the AF2 site was sent in September, 1987 to the Smithsonian Institution for an evaluation as to it's significance. Three months later the evaluation was complete and the results wired off-- *"[I] recall sharply the excitement I felt upon looking at parts of your collection for the first time"*, Nicholas Hotton III, research curator for the Department of Paleobiology wrote, *" For the collection is most impressive. The quality of the material is excellent, and your locality must at least be as rich as any Late Paleozoic footprint locality thus far reported, including the classic ones of the Grand Canyon worked by C. W. Gilmore many years ago. Last, but by no means least, your procedures for collecting and documentation of the material conform to the most up-to-date professional standards.*

The material collected so far is highly significant from the point of view of biology, both in the diversity of the preserved biota and in the quality of the trackways, [and]...most of the Early Permian terrestrial tetrapods are present. All of these

groups are represented by trackways good enough to allow analysis of stride length and gait, which provides access, heretofore lacking, to the locomotor behavior of nearly the whole spectrum of Early Permian terrestrial tetrapods. ...In summary, I think the exploitation of your Las Cruces locality will prove of great scientific value... I have no doubt that if properly cared for, your material will remain of value to the paleontological community for a long time to come."

Hotton immediately called David Berman, curator of vertebrate fossils at the Carnegie museum in Pittsburgh, with the news. One month later a similar evaluation was done by the Carnegie with equally impressive results--, *"...This is probably one of the most outstanding fossil trackway localities ever discovered for vertebrate and invertebrate animals in terms of quantity, quality, and variety.*

The great variety of trackways provides the best opportunity available to obtain a regional census of the animal life during the early Permian in south-central New Mexico... This locality will undoubtedly not only allow a more precise estimation of diversity, but also possibly the relative numbers or abundance of species, both of which are basic information for determining population or trophic structure.

In addition, the trackway impressions are extremely well-defined and will yield considerable anatomical detail. They also offer the most direct evidence of an animal's gait, stride, and posture, and the range of locomotor capabilities. Unique insights

into aspects of the social behavior or activities will undoubtedly be obtained by study of the trackways.

...As the identification of the vertebrate species that made the trackways progresses, not only will we have a better knowledge of some of their distribution patterns during the Early Permian, but possibly of the possible role of physical barriers, such as water, topography, or climate, in influencing faunal distributions or dispersals.

Mr. MacDonald has employed modern professional procedures and standards in the excavation and care of the trackways, despite the very arduous work required under what must be extremely uncomfortable conditions.

In summary, Mr. Jerry Paul MacDonald's discovery will undoubtedly yield very significant scientific returns. This project should, therefore, be given every encouragement to succeed."

A short time later, further comments on the Robledo collection were received from Mary Dawson, chairman of the department of earth science at the Carnegie museum: *"We are most enthusiastic about the progress of your project on the fossil trackways...of New Mexico. We have received glowing reports about your discoveries. The information you have gathered is of very high scientific importance. Many of the animals found in the area will come to be known only by their footprints, This discovery will provide the only record to the existence of many new species."*

8

DESCRIPTION OF DISCOVERY UNIQUENESS

So just what **was** discovered? Since the museums which did the evaluations were aware that the area had been previously known, a fact that has been stated all along in press conferences and in scientific reports generated through the project, what was all the excitement about?

The discovery can be broken down into several interrelated pieces. First of all, the material collected through reconnaissance work from February, 1987 through December of that year was of a quality surpassing anything collected before. The obvious variety in the taxonomy was also unique. A fine collection of invertebrate trackways, as well as large sequences with big tracks from a variety of different animals, was unparalleled. Additionally, the material was fresh, with no evidence of erosionary processes to diminish the clarity. In fact, the preservation was so perfect that it was impossible to imagine preservation getting any better. And most importantly, it was material that could be placed back in situ, a key and fundamental difference between the new work and prior collecting. Furthermore, there were numerous replicative trackways found in a variety of sediments, from sandstones, siltstones, mudstones, and shales. And the quantity of trackways was inexhaustible. Nearly every slab in situ had evidence of life.

Secondly, the extent of the deposit was never explored before. Although there were several trackway outcrops, all of the material

was found as debris, and no systematic excavation of the outcrops had occurred before. Therefore it was not known how extensive the track-bearing beds were, as no attempt was made to remove the overburden and explore the layers. When layers were analyzed in situ, it was for sedimentological or stratigraphical work, not for paleontological research.

Thirdly, and possibly most importantly, the trackway material was woefully misdiagnosed. The most obvious reason for this was that there was hardly any material to evaluate in the first place. The small amount of material that was collected was never sent off for an evaluation by experts versed in Permian taxonomy, history, and trackway analysis. Only such experts could accurately evaluate the significance of the material.

Why the material was correctly diagnosed now can be attributed to the fact that I had already amassed an imposing collection of good material through months of reconnaissance work in which I sampled 20 successive layers. I brought a wealth of material and photographs to both the Smithsonian and the Carnegie Museums of Natural History because they had specific research expertise in Permian vertebrate paleobiology. Both Nicholas Hotton of the Smithsonian's department of paleobiology and David Berman of the Carnegie are considered two of North America's foremost experts in the field. Additionally, the good variety of material could be easily compared to the 1926-1929 Gilmore collection of Permian trackways from the Coconino sandstone from the Grand Canyon and now permanently housed at the Smithsonian Institution.

Related to the misdiagnosis was a complement of inaccuracies surrounding the trackways. The age of the material was incorrectly promoted as middle to late Permian, up to 50 million years too young. And there was a printed bias that the tracks could never properly be identified, either due to poor quality, or to lack of supportive research.

The depositional environment was incorrectly assumed to be primarily dune. It was not until 1985 that the ancient environment was attributed to tidal flat. This new information was key in showing why the trackway material was so perfectly preserved and so extensive. Such large deposits with tracks are generally not associated with dune environments. Additionally, there was the widespread belief that the material was too difficult to get to, almost impossible to split, and frustratingly "secretive" about which layers "they" came from. The outcrops were also far away from motorized vehicle, which presented problems for consistent work.

Yet the new research material proved that the trackways could be identified, and followed for a considerable distance, sometimes for 40 feet or more. And the species list was phenomenal; five subclasses of vertebrates, three among the reptiles (anapsids, diapsids, and synapsids) and two among the amphibians (Labrynthodonts and Lepospondyls) alone, breaking down into eleven distinct orders. Then there were numerous families and countless species. And then there were the invertebrate trackways; one can only guess at the number of various arthropods and insects

represented. By the fall of 1989 there were over fifty separate species of invertebrate and vertebrate animals represented, as well as several species of plant. Yet even more exciting than the amazing diversity of animal life was the fact that many of these animals, (the Carnegie Museum estimates that perhaps half of the census) are new, undiscovered species.

Since there was no substantive word of the trackways in the scientific literature, the paleontological community was never apprised of the occurrence and possible significance of the locality, and as a result no systematic work had ever been done on the tracks. The world's foremost experts on trackway systematics, as well as experts on Permian vertebrates knew nothing of the Robledo locality.

But now great attention has been drawn to the area because of material congruent with such stellar interest. Scientists from the Smithsonian and the Carnegie Museum in Pittsburgh made special trips to the Robledo excavation, and museums and academic institutions began laying the groundwork for further systematic research. Major reports on the trackways have been written up by the American Geological Institute, the National Geographic Society, and numerous other organizations. Scientific articles have appeared in the American journals GEOTIMES and EARTH SCIENCE, the British journal NATURE, the Canadian journal GEOLOG, as well as NATIONAL GEOGRAPHIC, and SCIENCE WORLD, and are forthcoming in several others. Grants for research have been secured from the Carnegie Institute, the Los Angeles County Natural History

Foundation, The Smithsonian Institute, and the Commission on Higher Education.

Since the August, 1988 press conference even greater discoveries have been made. The longest trackways ever from the Paleozoic Age have been uncovered, surpassing anything discovered before. Trackways 20, 30, 40 feet long have been found of giant carnivorous reptiles and lumbering amphibians.

Scientists working in Southern New Mexico have found the bones of animals that could have been the trackmakers some of the 280 million year-old footprints recently discovered in the area.

Jerry Paul MacDonald, discoverer and subsequent field director of the Smithsonian-based Paleozoic Trackways Project, announced today the discovery of an ancient stream bed that may be rich in bones from the Early Permian period, a time 70 million years before the emergence of dinosaurs.

"This could be an even more significant discovery than the footprints themselves, in the sense that it is the first recorded occurrence of Permian bone this far south in New Mexico," MacDonald said. "All of us knew there just had to be bone in the area, since it was so rich in tracks. The burning question was 'where'?"

The big break in the search came in May of this year when Dr.

Nicholas Hotton of the Smithsonian Institution's Paleobiology Dept. came for several days of field exploration with MacDonald. News of a major new trackway deposit discovered by Trackway Project assistant Doug Wood, a graduate student in education at New Mexico State University, and MacDonald six months ago led to heightened reconnaissance of the new area. MacDonald refused to discuss the location of the new trackway deposit except to say that it is "quite a distance from the Robledo Mountains", site of the major fossil footprint discovery which shook the paleontological world in the spring of 1987.

The first day with Hotton at the new deposit, also dated as Early Permian, led to the discovery of a very small lens of sediment of the type often associated with bone. MacDonald said the lens was buried deep in rock except for a 3 square-foot area. "There appeared to be bone fragments in the lens, but we were unable to get them out to tell for sure. They were very badly broken up." MacDonald said that they searched that day for a better outcrop but had no luck.

On the 16th of June, MacDonald got the trackway team together for the first organized search for bone. "Doug Wood was first going to take us to a new area that contained some track and plant material", MacDonald explained. "We decided to take a short cut through a small canyon. Out of the corner of my eye I saw a large outcrop exactly like the small lens of rock that Hotton and I had found only days before. The bones were laying bare on the surface. Our search for bone ended five minutes after it started."

Present at the discovery in addition to MacDonald and Wood, was Ph.D. student Mark Schult of the University of Indiana. Schult is completing the first of two summer field seasons studying MacDonald's tracks. "The bone is interspersed within the debris of an old stream bed, which is a good place to start looking no matter what era you are studying," Schult said. "Our visual identification of bone was seriously hampered by the large quantities of petrified wood found in the same outcrop," Schult explained. "To make matters worse, the wood and the bone are almost indistinguishable in color, both being coal black."

"The only way to know for sure which was bone and which was wood was to perform some laboratory studies of the specimens," MacDonald said. Last Friday, MacDonald and Schult took the specimens up to Don Wolberg, vertebrate paleontologist with the New Mexico Bureau of Mines and Mineral Resources in Socorro. Schult made a cut of one of the fragments and placed the section under the scope. A studied gaze at the interior of the fragment conclusively showed the vesicular nature of bone marrow. Wolberg concurred. "It took five hours of driving time for a five minute lab study," MacDonald and Schult joked, "but we had to make certain of what we had."

"I think this latest discovery vindicates my work once and for all", MacDonald said. "Every step of the way we have proven how rich the paleontology is in Southern New Mexico even in the face of unceasing local criticism." "It's sensational", exulted Hotton in

a phone interview. "The discovery of bone in association with the tracks makes his discovery a whopping 10 out of 10. He now has tracks, plants, insects, and skeletal remains in the same area. It's a paleontologist's dream."

MacDonald said the outcrops yielding the bones will be studied by vertebrate paleontologists at both the Smithsonian and the Carnegie museums. "I know enough about bones to move over and let the experts have at it," MacDonald said. Dave Berman, curator of vertebrate fossils at the Carnegie Museum, has studied Permian animals from New Mexico for the last 25 years. Berman was the first to find bones of Dimetrodon, the fierce top predator from the Permian, in New Mexico near Albuquerque in 1977. "At the rate Dave was working, it would have taken him another 10 years before he got to Las Cruces to search for bone. We are thrilled to have saved him that much time," MacDonald said.

The numbing series of discoveries made in the Las Cruces area since 1987 include: the world's longest trackways from the Paleozoic era; an ever-growing list of the trackways of over 50 vertebrate animals, of which at least half are new, undiscovered species; nearly 50 arthropod and insect trackways; over two dozen species of plants; and now bone, all in an area MacDonald said was ignored by vertebrate paleontologists as "unproductive."

"I have always been a firm believer in second opinions", MacDonald said. "Who was going to believe us this time?" Three years ago MacDonald sought professional evaluations of his trackway

finds from both the Smithsonian Institution and the Carnegie Museum of Natural History in Pittsburgh after in-state opinions proved less than positive. Both Museums employ recognized specialists in the Permian Period. The written evaluations of both museums were that MacDonald had uncovered the greatest Paleozoic trackway deposit in the world, surpasing even that found in the Grand Canyon. A short time later the Natural History Museum of Los Angeles County joined the Smithsonian and Carnegie Museums in financial and technical support for MacDonald's work.

"The timing of the bone discovery is incredible", MacDonald said. "To find bone just a few days before the senate hearings begin is a marvelous stroke of good fortune, and should forever silence the skeptics concerning the quality of our work and the significance of our finds."

Senator BINGAMAN. Thank you very much, Jerry. Before I ask you any questions, let me just indicate we will put in the record at this point the letter that Nicholas Hotton has sent us on the issue dated June 28 in reference to your work and he states in that letter—Nicholas Hotton is research Curator for the Department of Paleobiology with the National Museum of Natural History at the Smithsonian.

And he says there that:

Mr. MacDonald has carried out his work in a thoroughly professional manner. The trackways that he has collected thus far are fully documented as to stratigraphic position and relationship to one another. The quality of their curation assures that they can be related to arthropods known from bones, and their condition and continuity are of incalculable value as indicators of the living activities of such animals. He deserves full credit for this work, which he has carried out virtually singlehanded.

[The letter follows:]

National Museum of Natural History · Smithsonian Institution
WASHINGTON, D.C. 20560 • TEL. 202-

June 28, 1990

Mr. Brent Handley
524 Hart Building
Washington, D. C. 20510

Dear Mr. Handley:

Pursuant to our telephone conversation this morning, I am writing to confirm my professional opinion of the Robledo Hills footprint locality, and the quality of the work being carried out there by Jerry Paul MacDonald. I undertake this task with pleasure, because I think the occurrence is of great scientific significance, and have been very favorably impressed by Mr. MacDonald's work since I first became acquainted with him more than three years ago.

From what I've seen of it, both on the ground and in photographs Mr. MacDonald has sent me, the Robledo Hills trackway locality is probably the best of its kind of Permian Age. The only one that can be compared with it is in the world-famous Coconino Sandstone, in the Grand Canyon, which, however, includes mostly tracks of small animals. The Robledos tracks, by contrast, include large as well as small animals and probably represent all major taxonomic categories of Lower Permian tetrapods otherwise known only from bones. The Robledos quarry also yields tracks of otherwise unknown arthropods, and good impressions of plants, each of which will provide invaluable information regarding the environment of the time.

Permian fossils, bones and tracks alike, are about 270 million years old, and they represent our first detailed view of terrestrial life not too long after it had emerged from the water. There are older terrestrial fossils from various places in the world, but none known in such detail over such a broad area-- bones of these animals are found all the way from Arizona to central Texas. My own specialty is bones, which tell us what the animals looked like, and with luck where they died and how they came to be preserved. Trackways, however, tell us what they were actually doing during life-- each one is a little snapshot of what some Permian reptile or amphibian was up to on one day in the far-distance past. Both these lines of evidence, bones and tracks together, are essential for proper sciencific grasp of what life was like so long ago. However, I think that trackways offer a much more dramatic illustration of such life, and will be correspondingly more impressive to the public if they have controlled access to the Robledos locality.

Mr. MacDonald has carried out his work in a thoroughly professional manner. The trackways that he has collected thus far are fully documented as to stratigraphic position and relationship to one another. The quality of their curation

assures that they can be related to tetrapods known from bones, and their condition and continuity are of incalculable value as indicators of the living activities of such animals. He deserves full credit for this work, which he has carried out virtually single-handed.

I do hope that scientific work may continue at this locality whatever its ultimate disposition, because results to date have already attracted attention in scientific circles. A noted footprint expert, Dr. James O. Farlow, of the University of Indiana, expects to have a student of his engage in field work with Mr. MacDonald. This young man, a PhD candidate, is studying sedimentology and is interested in the role of footprints as indicators of sedimentary processes. I am very enthusiastic about this link because of the great variety of sedimentary features that are evident in the Robledos occurrence, and have felt all along the need for a sedimentologist to work on them.

In conclusion, I must express my appreciation of the cooperation afforded by Mr. Jim Fox, of the Las Cruces office of BLM. This cooperation has provided encouragement to a talented young man when he needed it most, and in doing so has given paleontology a rich source of data that will continue to be useful for generations to come.

Yours sincerely,

Nicholas Hotton III

Nicholas Hotton III
Research Curator
Department of Paleobiology

Senator BINGAMAN. So that is a strong endorsement and we join in that.

Let me ask you about the present arrangement. This is BLM land that you are working on and I gather you have had an agreement with the BLM which has permitted this work to occur. What is the situation as to the tracks that have been removed and stored elsewhere? What is your arrangement with the BLM on that, if you could advise us?

Mr. MACDONALD. The extent of the material, as you could see, is very vast. So in short order, depending on how healthy I am, I can amass quite a collection of material, which requires a fairly large facility for their storing. The BLM does not have a facility that large at present.

We have had an agreement with Dona Ana County where I get a warehouse from the Southern New Mexico State Fairgrounds for a dollar a year. In exchange, during the Southern New Mexico State Fair, I open up the lab for public viewing. But this situation is rapidly becoming inadequate, as the warehouse is full.

I may have committed the unpardonable sin, I do not know, but myself and my other helpers have exposed quite a collection of trackways at the site for this hearing to convince and show the absolute incredible productivity of the site. That material has to be taken out. It cannot survive out there exposed.

My personal feeling is we definitely need and warrant a facility that would adequately display and curate this material. There is no other material like it in the world. And the material is so extensive that even at this point, I could fill a 4,000-square-foot museum with trackways and trails and things of that nature.

Senator BINGAMAN. Now, at the present time is there any security to protect the tracks that you have excavated? Is that a concern?

Mr. MACDONALD. Yes, that is a great concern. Some of you may know that over a year and a half ago we had a major theft in the area of the best 6 feet of the 20-foot trackway that I alluded to earlier. And the BLM deserves all the credit in the world for its quick reaction to the theft and the posting of a $1,000 reward for arrest and conviction. And we received the material back. Also the media needs to be credited with quick coverage of the theft and that was very instrumental in getting it back.

We have not had any problem since then except my tools have been stolen twice. But I certainly accept stolen tools over stolen material.

We have put a gate over the road leading to the main excavation site, but I believe that heightened work in the area and the more layers that we expose, the more vulnerable the area is going to be. So we definitely need better or more creative ways of providing security.

Senator BINGAMAN. Let me ask on this latest, this finding of bone in the area, what is needed in order to pursue that, to determine what significance that has or explore for additional bone? Where do you see all that leading and what resources are needed to accomplish that?

Mr. MACDONALD. Well, first of all, there needs to be some kind of relationship with the Federal Government and the people or the institution that possesses the land. And because the area is not on

BLM land, we are not going to do any excavation until some kind of agreement can be worked out.

But even more than that, the area yielding the bone is extremely vulnerable. There are some fairly heavily traveled roads very close to it and because of that, we cannot disclose really where the locality is, either. But it is very significant.

It is the first occurrence of Permian bone in southern New Mexico. And Nicholas Hotton, a quote he said over the phone was—well, first of all he was saying, "Darn it, you told me right after I faxed my report to Senator Bingaman." But he said, "It is sensational. Now in the same deposit we have footprints, insects, plants and skeletal remains, which is a very unique occurrence." So it is very significant.

And I would imagine that eventually we would have that—I think it needs to be protected as well, is what I am trying to say.

Senator BINGAMAN. The legislation we have introduced calls for a study to be conducted, about a 1-year study, to determine what further action should be taken, what is needed in the way of curation and all. In your view, does the scope of that study need to be expanded to deal with this bone issue or not?

Mr. MACDONALD. It needs to be expanded in the sense that we have in many respects a whole different kind of animal than what we have now, no pun intended. The working and excavation of bone is much more technically precise, I would say, than the trackway excavations. So even if an agreement is worked out, vertebrate paleontologists need to come in to work on that deposit. I am not qualified and neither are any of my other helpers. It may need to be expanded in that regard.

I would hope that in this study year that we could find some kind of protection and include that site in the protection of the Robledo outcrops. It definitely deserves protection.

In addition to the paleontological significance of the new site, there are some Indian petroglyphs within 600 yards of the bones and the tracks, and also we may have found an undiscovered Indian village, ancient Indian village, near the petroglyphs. I am going to have some archaeologists go out with me next week and look at that. In any event, it is also a very important deposit that I think needs to be protected.

Senator BINGAMAN. You indicated some of the organizations and museums that have come and looked at the site and indicated an interest. Are there foreign countries that have indicated an interest in this as well, and could you describe that?

Mr. MACDONALD. Yes. It has been problematical for me, especially as my funding gets lower and lower and as I get deeper and deeper in debt. But as a result of the National Geographic article, we have had inquiries from the University of Bristol in England, the National Science Museum, in Tokyo, Japan, some paleontologists in Australia and some other scientists in Germany. And in particular, they are very interested in finding out how their museums and their institutions can acquire trackways from this deposit.

I feel very strongly and I know the Smithsonian, Carnegie and L.A. County museums feel very strongly, that the facility and the curation of nearly all of the material needs to remain in this area because it is a deposit. And I want to say, for the record, that there

are other countries that are very interested in this discovery. And I think that perhaps we need to consider what we can do as a government to protect a national resource that is part of this country. And so, yes, there is a lot of international interest. There is no question about that.

Senator BINGAMAN. Jerry, I could go on here for a long time. But we do have some other witnesses. Let me just congratulate you on the great discovery you have made and all the work you have done, and we will try as best we can to move forward with the legislation to try to assist with some of the resources you need to continue.

Mr. MACDONALD. Thank you, sir.

Senator BINGAMAN. Thank you very much.

Let me call our first panel of witnesses, and that is Mr. Larry Woodard, who is the State director of the BLM in Santa Fe, who has had a long-standing interest in this, and Mr. Doug Faris, who is chief of planning with the southwest regional office of the National Park Service. I have asked each of them to make a statement here. If they would both come up, I would appreciate it.

Larry, why don't you go ahead and start.

STATEMENT OF LARRY WOODARD, STATE DIRECTOR, BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR, SANTA FE, NM

Mr. WOODARD. The area we visited this morning, I will leave with you some enlarged maps that are referred to in your proposed legislation that describe about a 736-acre area as outlined in red on this other map, which we believe would be the area that should be temporarily withdrawn to protect the known sites that Jerry has found in the Robledo Mountains during the period of the study and then for 2 years thereafter.

Senator BINGAMAN. The amount of land you are indicating is 736 acres. Is that right?

Mr. WOODARD. Yes.

Senator BINGAMAN. When you talk about it should be withdrawn, could you describe a little more what the consequence of that would be? What is the legal consequence of that?

Mr. WOODARD. The primary consequence of that would be to protect the area from mineral location, miners filing mining claims in that area during that time. Other than that, we are, through our administrative means, fairly well capable of handling other possible intrusions into the area. But that is the one that we need some help on. So I will leave those maps with you for the record.

Senator BINGAMAN. Thank you.

Mr. WOODARD. As Jerry has indicated, he works as a volunteer for us. We have provided him to date minimal financial support. He has reached the point in his discovery where I think he correctly points out that besides the preservation of the quarry sites and protection of those, which we would hope could be studied and the proper means identified to do that, I think the focus really needs to be now on the curation aspect.

He has developed an extremely large collection. They need to be properly housed. As indicated, they offer an opportunity for international research in this area and I think that during the year of

the study, working with friends like Doug Feris in the park service on interpretive and curational aspects, along with the Smithsonian, that we could present back to you in a year the proper way of curating the site, give you some ideas as to how that could happen. We are prepared to proceed with that kind of a study.

Senator BINGAMAN. As you understand the bill that we have introduced, does it give you the authority and the breadth of scope that you need to conduct the study that you think is appropriate?

Mr. WOODARD. I would suggest a couple of modifications. One, under section 3, under withdrawal, where it says 40 acres, I would suggest that read 736 acres. And as Jerry has said, his new find here of bones now in a different area, there may need to be language inserted in section 4 that would relate to cooperative agreements.

Now, we have the authority to enter into cooperative agreements, but I think that could be highlighted so that if we have to cooperatively get into some arrangement with another entity to protect other sites, that we would have a legislative reason to do that. We are obviously moving a bit away from the Robledo Mountains.

Likewise, under the contents of the study, we might want to include a discussion of cooperative arrangements with other agencies and so forth. But other than that, the bill by and large would allow us to take those steps necessary in a study to give you a fairly complete report on this.

Senator BINGAMAN. Do you feel that the 1 year that is contemplated in the bill would be adequate time to do that?

Mr. WOODARD. I believe so. We will have to hustle, but I think we would get immediately with people like the Smithsonian, particularly, and craft a study plan and get on with it.

[Mr. Woodard submitted the following:]

BLMFACTS

BUREAU OF LAND MANAGEMENT
NEW MEXICO STATE OFFICE, P.O. Box 1449, Santa Fe, NM 87504

Las Cruces
Paleozoic Trackways

o Trackways on BLM land (Las Cruces District, Mimbres Resource Area) in Robledo Mountains, about 5 miles NW of Las Cruces.

RESOURCE
o Estimated to be 280 million years old (Early Permian Period).
  --Vertebrate fossils range from small lizard-like reptiles to large prints made by 5-foot-long sprawling quadruped.
  --Numerous plant fossils include branches of primitive conifers more than 5 feet long.

EXCAVATION
o Paleo excavation permit issued 4/21/88 to Jerry MacDonald, NMSU graduate working on Ph.D. in sociology.
  --Project sponsored by Smithsonian Institution (Dr. Nicholas Hotten), Carnegie Museum of Natural History in Pittsburgh and Los Angeles County Museum of Natural History--they believe the trackways are some of the most outstanding ever discovered.
o MacDonald entered into a volunteer agreement with BLM in the summer of 1988.
  --BLM to date has provided limited support to research effort.
  --MacDonald provides assistance with the media in public education efforts.
o Dona Ana County provides laboratory space at Southern NM Fairgrounds for storage and analysis of the excavated trackways under an agreement with BLM.

PROTECTION NEEDED
o Trackway area needs protection.
  --Surrounding land leased for grazing and receives light dispersed recreation use. There is also a stone quarry adjacent to the site.
  --Several slabs were stolen in summer of 1988--later recovered by BLM Rangers.
  --BLM law enforcement has increased patrol of the area

- O V E R -

36-241 0 - 90 - 3

Trackways continued, Page 2

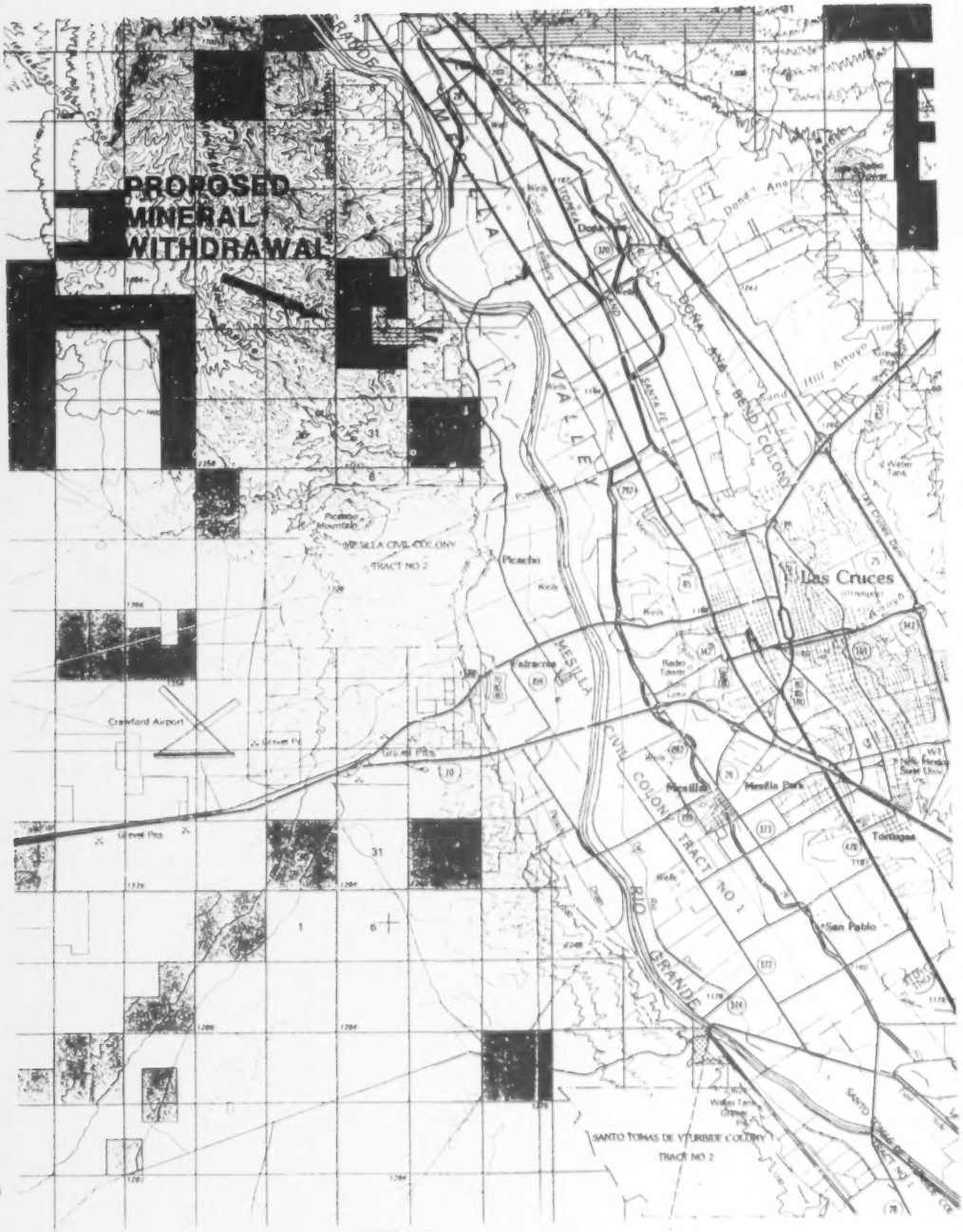
LEGISLATION

o Senate Bill S. 2684 introduced by Bingaman & Domenici (H.R. 4945 introduced by Skeen).
  Bills provide for:
  --Temporary withdrawal of 40 acres of the site area so a proper study can be completed.
    - BLM prefers a mineral withdrawal of 736 acres that would include all areas where paleontological survey has identified additional trackway sites.
  --A study of methods to protect and interpret scientifically important fossil trackway sites.

MANAGEMENT AND PLANNING

o BLM management approach:
  --Emphasize research & protect site to allow further research, and
  --Provide interpretation.
o Mimbres Resource Area Management Plan being prepared.
  --Will identify specific management options for the site and incorporate the findings of the study authorized by this bill.
  --Anticipate trackway site will be designated ACEC.
o Appropriations needed FY 91 - $125,000.

(7/3/90)


PROPOSED
MINERAL
WITHDRAWAL
MESILLA CIVIL COLONY
TRACT NO 2
Picacho
Las Cruces
Crawford Airport
Gravel Pits
MESILLA VALLEY
DONA ANA BRANCH CANAL
RIO GRANDE
SANTO TOMAS DE YTURBIDE COLONY
TRACT NO 2
Mesilla
Mesilla Park
Tortugas
San Pablo

Senator BINGAMAN. Thank you very much. Doug, why don't you go ahead and indicate your thoughts from the point of view of the Park Service.

STATEMENT OF DOUG FARIS, ASSISTANT REGIONAL DIRECTOR, PLANNING, SOUTHWEST REGIONAL OFFICE, NATIONAL PARK SERVICE, DEPARTMENT OF THE INTERIOR, SANTA FE, NM

Mr. FARIS. Thank you, Senator Bingaman, and I appreciate the opportunity to make a few comments today. The National Park Service does not have a prepared statement to make today and has not had an opportunity to do any evaluations in cooperation with the Bureau of Land Management or the researchers on this area before.

I would say from what I have seen today there do appear to be remarkable resource values there. I think, as you have stated, Senator, those who have been undertaking this research certainly should be commended for not only the findings, but the conditions within which they have undertaken that research.

In evaluating the bill that you have introduced for study of this area, it certainly would seem to be a justifiable study. I would agree with the State director of the Bureau of Land Management, Mr. Woodard, that a significantly larger area be withdrawn from action at this time until this area could be evaluated in some detail. I would also recommend that if the study proceeds, that all of the natural and cultural resource values of the area be documented and included within a study, which could potentially be completed within a year's time.

It occurs to me that in order to adequately and properly document the significance of the site would not only take the assistance of research experts within the interior department, but also from other institutions, the Smithsonian and other educational institutions, to fully evaluate their significance according to the criteria that the National Park Service commonly uses.

Senator BINGAMAN. Thank you very much. Let me ask Larry Woodard: As I understand it, there are some quarry activities that are presently in place and ongoing near this area. What effect would the withdrawal that you are proposing or that we are contemplating in this legislation, what effect would it have on those quarry activities?

Mr. WOODARD. Our local office has drawn a boundary around the 736-acre area that we would suggest which would exclude that quarry activity.

Senator BINGAMAN. So there would not be any effect?

Mr. WOODARD. That is right.

Senator BINGAMAN. Is there any area in the country that is currently being managed for its paleontological resources in a way that might be appropriate here? Are there other areas around the country that are good models that we can look at where they have found similar sites or something that they have tried to preserve and manage?

Mr. WOODARD. Probably the best examples are BLM and park service sites in Utah, I suspect. And I am not personally that familiar with it.

Senator BINGAMAN. Doug, do you know of any sites that would be examples of what we might be winding up doing here?

Mr. FARIS. I am not too familiar with the activities of where the Bureau of Land Management may do this kind of display. Congress has authorized within the National Park System several units that focus on the preservation and interpretation of animal and plant remains of the geological past. Probably the most commonly known one would be Dinosaur National Monument in Colorado and Utah. In that location, which includes large natural areas as well, we interpret and display and do active research, which is available to public viewing, the remains of dinosaur bones and other paleontological resources.

We do have other areas in Colorado, such as Florissant Fossil Beds, in Oregon, John Day Fossil Beds, and, of course, the fairly well-known site in northern Arizona, Petrified National Forest, where we do this type of interpretation. Of course, there are many other park service units that include these types of resources, but they are not a focus of the interpretive program.

Senator BINGAMAN. Larry, let me ask: We passed a wilderness bill that included the fossil forest a few years ago through the Congress. Could you describe what is being done in connection with that and how that relates to this?

Mr. WOODARD. In the Chaco Wilderness legislation there were two wilderness areas established, Bisti and Dennison, and then Congress also directed us to do a study of the fossil forests. This is a petrified log area similar to the one in Arizona with the park service. That study is coming to a completion and we will be submitting that report to Congress here shortly.

Senator BINGAMAN. That report will make a recommendation as to the status that the fossil forest should be given?

Mr. WOODARD. Yes, it will.

Senator BINGAMAN. Those are the questions that occur to me at this point. Let me——

Mr. WOODARD. Senator, can I add one point here?

Senator BINGAMAN. Yes. Go right ahead, sure.

Mr. WOODARD. Just one final point. This is now the summer of 1990, and as the beat-up paleontologist just described to you, what we do need here, though, in the pretty near future are some financial assistance both for him and for the immediate protection of that quarry area. So I would want to interject that, that in order to really get on top of this now, we will need some financial help, as well as if the bill passes, the funding to accompany that to do the study.

Senator BINGAMAN. We have talked to some of the appropriators about that. We hope we can help on the financial end of things.

Mr. WOODARD. Thank you.

Senator BINGAMAN. Thank you both very much for testifying.

Our next panel consists of four individuals, and let me call them. Mr. Greg White, who is the senior planner for Dona Ana County; Thomas Gale, who is the dean of the college of arts and sciences here at New Mexico State; Mr. Edson Way, who is the acting director of the New Mexico Museum of Natural History; Mr. Don Wolberg, who is the vertebrate paleontologist at the New Mexico

Bureau of Mines and Mineral Resources in Socorro. If they would each take a chair, please.

Why don't we start with you, Mr. White. We appreciate you being here. You are the senior planner for Dona Ana County. Am I correct in your title?

Mr. WHITE. That is close enough.

Senator BINGAMAN. You correct me to the extent it is wrong, please.

Mr. WHITE. I am a planner for Dona Ana County.

Senator BINGAMAN. We are very pleased to have you here. Why don't you go right ahead with any statement you have.

STATEMENT OF GREG WHITE, PLANNER, DONA ANA COUNTY, LAS CRUCES, NM

Mr. WHITE. Thank you, Senator. I would like to read a letter which was signed by the Board of County Commissioners in support of this bill, 2684. It is to yourself and the Hon. Pete V. Domenici:

GENTLEMEN: We, the Board of County Commissioners of Dona Ana County, New Mexico, appreciate and support your efforts to document and protect the nationally significant fossil trackways found in the Robledo Mountains near Las Cruces, New Mexico. Your sponsorship of Bill S. 2684, the Prehistoric Trackway Study Act of 1990, is recognized in Dona Ana County as being positive, responsible government.

We were concerned about possible vandalism and looting of the trackway site. We all know that sites containing removable traces of our ancient heritages are targets of opportunity for unscrupulous individuals who destroy as much or more than they remove in their hasty and illegal actions.

On the other hand, scientifically and legitimately removed portions of trackway displayed at the Museum of Natural History and the Southern New Mexico State Fair have inspired the imaginations of local residents and visitors to our state with appreciation for the rarity of the area now known as Dona Ana County.

Their heirs should have the same opportunities. Adoption of bill S. 2684 is an important first step in assuring that this unique record of the past will be preserved for future generations to appreciate.

And it is signed, "Sincerely, Everardo L. Chavez."

Senator BINGAMAN. Did you have anything else you would like to add to that letter?

Mr. WHITE. We would like to say if there is anything we can do in the planning level, we will be happy to help, that the Board of County Commissioners has been happy to participate by providing storage for the trackways and that their efforts to continue helping will be forthcoming.

Senator BINGAMAN. Thank you very much. We also have in the audience some representatives from the West Picacho Association, who have a letter and we will include the testimony in the record. We appreciate your presence very much. We appreciate your support.

Did any of you wish to make a statement? Go right ahead.

[The letter referred to follows:]

Royal Host Motel — Pancake Alley Restaurant

July 2, 1990

The Honorable Jeff Bingaman
U.S. Senator
200 East Griggs Street
Las Cruces, NM 88001

Dear Senator Bingaman:

Members of the West Picacho Association in Las Cruces, New Mexico, have long been interested in the fossilized trackways find of Jerry MacDonald in the Robledo Mountains. We have not been happy that New Mexico State University in Las Cruces has done very little to encourage Jerry's efforts, even though scientists of world reknown are calling his discovery "a glorious find." The W.P.A. membership feels that an on-site facility would hold the most interest for scientists as well as visiting tourists. Believing that travellers will be interested in the trackways, the W.P.A. membership is hard at work in the attempt to beautify the highway and revitalize businesses along the route.

We have accomplished two notable things since the New Mexico State Highway Department announced that a new overlay on U.S. 70 would be initiated in 1990. An all new bridge over the Rio Grande on West Picacho and sidewalks along the street where none have ever existed are both now part of the New Mexico State Highway Department's Five Year Plan.

Currently, with the help of Nims, Calvani & Associates, architects, we are struggling to have the lighting changed along West Picacho. Enclosed is a copy of our long range planning goals.

There are over 10,400 vehicles using U.S. 70 as a daily average, according to a recent Metropolitan Planning Organization study. With the continued heavy traffic volume made up mostly of tourists on our street, the W.P.A., by providing a lovely entrance to the city, is making every effort to entice travellers to stop and spend money in Las Cruces. Jerry MacDonald's trackways find could help make Las Cruces a destination point.

In January 1990 the W.P.A. held a brainstorming session to alert Las Crucens to the opportunities available at the confluence of the Rio Grande river and U.S. 70. A copy of the agenda for that meeting is also enclosed.

2146 W. PICACHO - HWYS. 70, 80 & 180 WEST LAS CRUCES, NEW MEXICO 88005 (505) 524-8536

Our unique position at the juncture of a federal highway and the legendary Rio Grande dictates that we find an acceptable way to present the aesthetic and scientific values inherent in the surrounding area. Our association thanks you for your efforts on behalf of Jerry MacDonald's scientific find and stands ready to assist you in your endeavors should you so desire. We can be reached at (505) 524-8536; ask for Vi Fisher. We plan to attend the July 6 hearing.

Sincerely,

Vi Fisher

Vivabelle Fisher
Projects Committee Chairperson
West Picacho Association

VF:nw
Enclosures

WEST PICACHO ASSOCIATION
LAS CRUCES, NEW MEXICO

LONG RANGE PLANNING GOALS

1. U.S. 70 to be repaired with an overlayment soon and then kept clean swept and repaired.

2. An attractive new bridge over the Rio Grande river in keeping with the traditions of the old west.

3. Signs on the freeways indicating to travelers that West Picacho is part of an historic area worth visiting.

4. Attractive signs on both sides of the new bridge, indicating that our river is the legendary Rio Grande.

5. A developed park along the river and near the bridge with areas set aside for picnics, band concerts, and special events.

6. Attractive lighting along the river and the bridge in the to-be-developed park.

7. Attractive, frequently spaced lighting in turn-of-the-century design, to enhance West Picacho Avenue and the bridge.

8. New wide sidewalks from Main Street to the Rio Grande so that tourists may walk safely in groups or hand-in-hand in the evenings.

9. Medians beautified and landscaped by the city and subsequently maintained by the business people.

10. Overhead utilities immediately along West Picacho Avenue buried or moved back from the highway.

11. Adequate parking, provided by the city and business people working in conjunction with West Picacho property owners, to assist the State Highway Department in its efforts to enhance the highway.

12. Concomitant with expanding parking opportunities on the street, enhancement of alleyways to the rear of businesses, with bricked paths and lantern-like lighting.

13. Pocket Parks as meditation points, conversation spots, and shoppers' resting places.

14. A convention center established in the West Picacho area.

15. The city to take appropriate action to insure that the sewage plant odors are remedied.

16. Assistance from local and federal governments in providing low-cost loans in financing the upgrading of business property improvements.

17. Business groups in other parts of the country encouraged by the city to invest in ventures that will improve the image of the old trail which is now the U.S. Highway 70 corridor. Such ventures, helping to create an old west atmosphere, will bring in more tourist dollars.

18. In cooperation with the police and the west side community, residents and business owners along West Picacho encouraged to take a stand against illicit drugs and prostitution, using their powers of observation and promptly reporting suspicious activities on the street.

19. Leadership from the city in showing the W.P.A. how to secure matching funds and how to qualify for programs such as "Adopt A Highway", "Adopt A Median", or "Adopt a Barrel of Flowers".

20. W.P.A. members encouraged to be more active in local government, the chamber of commerce, and the convention and visitors bureau.

Gateway to the Southwest: At the Crossroads

W.P.A. Agenda
January 23, 1990

I. What can we do to make the new bridge over the Rio Grande become an enticement to tourists as well as pleasurable to local citizens?
DAVID BRAUER, Project Development Engineer, Santa Fe
GARY WILLIAMS, Nims Calvani Associates, Architect

II. What kind of landscaping do we want to enhance the bridge surround?
ALAN PUMPHREY, Parks & Recreation, City of Las Cruces

III. Would water events on the Rio Grande encourage tourists to spend more room nights in Las Cruces and more money in local businesses?

How might a dam near the bridge for water events have an effect on bridge plans?

What about funding?
LEE PARENT, avid sportsman, owner of The Lantern Restaurant

IV. Would a unique type of zoo help attract tourists to a Rio Grande river playland? What about funding?
JOHN HALTOM, Las Cruces City Councilor

✓V. Would the unique paleontologic and geologic aspects of this area, incorporated into a museum, help keep Jerry MacDonald's Dimetrodon footprints' discovery in Las Cruces? Could this museum enhance a Rio Grande river complex enough to bring more tourist dollars into Las Cruces? Funding for this project?
BETTY LADY, sponsor of the annual Las Cruces Gem and Mineral Show

VI. Are there other suggestions to help Las Crucens fully develop the bridge area potential?

STATEMENT OF VIVABELLE FISHER, PROJECTS COMMITTEE CHAIRPERSON, WEST PICACHO ASSOCIATION

Ms. FISHER. We really did not come prepared to make a statement, but I would like to say this. That we feel that having adequate entrance into the city from the west could help a great deal in making accessible this tremendous find to visitors from around the world as well as from around our own country. And we are working very hard to try to beautify West Picacho, revitalize businesses.

And we do have a beautiful new bridge that is planned for over the Rio Grande, there will be new sidewalks along West Picacho, and we are working very hard to have some attractive lighting, replace the old, ultramodern typical highway lighting that is, of course, along the highway. And so we have been working with the state highway department, with Dr. Quinton Ford, who is our highway commissioner from this area. And any way that we can cooperate to assist, we would be delighted.

We thank you, Senator Bingaman, for helping this area preserve something that is invaluable.

Senator BINGAMAN. Thank you for being here. We appreciate your interest and we will make your letter a part of our record here. And we appreciate the county's statements and position on this.

Let me next call on Dr. Thomas Gale, the dean of the College of Arts and Sciences, who visited the site with us this morning. Dr. Gale, we are pleased to have you here. We are anxious to hear your comments.

STATEMENT OF DR. THOMAS M. GALE, DEAN, COLLEGE OF ARTS AND SCIENCES, NEW MEXICO STATE UNIVERSITY, LAS CRUCES, NM

Dr. GALE. Thank you, Senator. The university is extremely interested in this important find that Jerry MacDonald has brought to everybody's attention, and we are very pleased with the bill that you have introduced. That does the two most important things, I think, to take advantage of the site at this stage of its development. The first is to preserve the site and protect it, and the second is to provide the wherewithal to continue studies of the site and its development.

Jerry is a graduate of New Mexico State University. This is a site in our own backyard, certainly with international significance, and as an institution we would like to do everything we can to help preserve it and encourage its further study. The university museum, under the director, Brad Blake, has provided, through exhibitions and lectures by Jerry, information to the general public as well as the scientific community on the site.

We regret we do not have anyone on our faculty in earth sciences at this time who can furnish the scientific expertise that we would like to have continue working on the development of the site. But in general, we want to remain interested in what happens on this site, to encourage in every way we can its protection and its development. And insofar as the university can, we would like to

continue to work with the scientists and others who are going to develop the site in the future.

Senator BINGAMAN. Thank you for that statement. We appreciate it.

[The letter from Dr. Gale follows:]

COLLEGE OF ARTS AND SCIENCES

OFFICE OF THE DEAN
Box 30001/Dept 3335
Las Cruces, New Mexico 88003-0001
Telephone (505) 646-2031

July 5, 1990
0004.txt

Senator Dale Bumpers, Chairman
Subcommittee on Public Lands,
National Parks and Forests
United States Senate
Committee on Energy and Natural
Resources
Washington, DC 20510-6150

Dear Senator Bumpers:

President James E. Halligan of New Mexico State University has requested that I represent him at the hearing regarding Senate Bill 2684 that would authorize a study of methods to protect and interpret the nationally significant fossil trackways found in the Robledo Mountains near Las Cruces, New Mexico. The trackways discovery by Mr. Jerry McDonald, a graduate of New Mexico State University, is an exciting one; and I am very pleased that Senators Bingaman and Domenici have introduced a bill that would authorize methods to protect and interpret the fossil trackways. The university has watched with great interest as new discoveries and additional scientific evidence have shown the importance of these trackways. The University Museum, under Dr. Bradley Blake, through exhibits and talks by Mr. McDonald, has given considerable publicity and made general knowledge available to the public about the importance of the trackways. We regret that we have no one at the university with special expertise to study the trackways, but we certainly support our colleagues at New Mexico Tech and elsewhere who are studying the importance of the trackways.

The trackways are an exciting discovery and the university, insofar as is practicable, would like to do everything it can to advance knowledge of the trackways and to help preserve and study them. The university gives strong support to Senate Bill 2684 so that the trackways can be protected and that support is given for continued study of their significance. The University Museum will continue its program of giving publicity and knowledge to both the academic community and the general public about the trackways. As an institution, we look forward, insofar as we have competent people and available resources, to being involved with the protection and continued studies of this significant find so close to our campus in Las Cruces. Dr. Russell Clemons, head of the Department of Earth Sciences, among many others, is convinced of the significance of this find and the importance of preserving and studying it.

Sincerely,

Thomas M. Gale
Dean

Senator BINGAMAN. Before I ask any questions of the panel, let me hear from each of the panel members. Mr. Edson Way, who is the acting director of the New Mexico Museum of Natural History in Albuquerque, is here and we appreciate your presence.

STATEMENT OF DR. J. EDSON WAY, INTERIM DIRECTOR, NEW MEXICO MUSEUM OF NATURAL HISTORY, ALBUQUERQUE, NM

Dr. WAY. Thank you, Senator. I am delighted to have been invited this morning. It gives me personal satisfaction because as a scientist myself and a museum administrator, my career is involved in scientific research and public education. And also as a person involved in the museum field, I am not unaware of the economic development potentials of this sort of discovery for the tourism industry in the Las Cruces area. These are both significant considerations as we proceed with the planning with this important location.

I have submitted written testimony, Senator, which I will briefly summarize and perhaps augment in one particular area. In looking at the proposed legislation, I think there are two major points that I would like to speak in support of this morning. First of these is the scientific importance of the discovery, which has been addressed by several other speakers and in the scientific literature. This is an extraordinary site which warrants protection, study and interpretation.

And in my preparation of my written testimony, I spoke to Dr. Spencer Lucas, the chief curator of the New Mexico Museum of Natural History in Albuquerque, and he wrote in a memorandum back to me,

> In terms of sheer number of prints, diversity of animals represented and quality of preservation, it truly is a world-class locality deserving of special recognition and intensive scientific study. As part of New Mexico's and the nation's natural history heritage, the site is a unique and valuable scientific and educational resource that should be preserved and interpreted for all citizens.

I think the photographs this morning and the field trip some of you took this morning has demonstrated to everyone's satisfaction the truth of that statement.

There is another aspect to the proposed legislation that I would like to draw to your attention. As a museum person, it is of interest to me, and it was addressed by the gentlemen on the previous panel. And that is that in addition to the scientific importance addressed in the proposed legislation, I think there is also a museological technical importance which should be considered, and that is the best means to achieve the goals of protection, study and interpretation.

I think that one of the most exciting aspects to this current discovery is the potential for management of these resources in situ, here in the Las Cruces area, as has been mentioned by previous speakers, with a focus on environmental reconstruction of a time period under consideration, including the topography, the geography, the faunal and floral assemblages, which are preserved in these fossil beds.

There are a number of outdoor museum approaches which might serve as models for consideration in this particular natural area. The Dinosaur National Monument was mentioned, but also some of

the mesa-top archeological sites, such as Mesa Verde, might also be investigated to see the applicability of those approaches to this particular locale here around Las Cruces.

As someone involved in the tourism industry, I often reflect back on a visitor I overheard in Santa Fe, who was summarizing their trip through New Mexico and the scenic wonders, the archeological resources which they had explored, and they summarized their experiences, "Poor New Mexico. There is so much beach and so little ocean."

Well, I think that this discovery shows that that was not always the case, and I think that that is a potential touristic economic development thing that we should keep in mind here in Las Cruces.

Thank you, Senator.

[The prepared statement of Dr. Way follows:]

Testimony in Support of A Bill, S. 2684, The "Prehistoric Trackways Study Act of 1990," July 6, 1990

Dr. J. Edson Way
Interim Director
New Mexico Museum of Natural History
P.O. Box 7010
1801 Mountain Road
Albuquerque, NM 87194-7010

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New Mexico, the Land of Enchantment, is known across the United States and throughout the world for the richness and diversity of its scenic, historical and cultural resources. The archaeological treasures of Chaco Canyon or Bandelier National Monument draw innumerable visitors to our state. At least as well known are the geological wonders of southeastern New Mexico at Carlsbad or the hauntingly beautiful visions of the lands near Abiquiu in the North portrayed in the paintings of Georgia O'Keeffe. And yet this survey of our state's image in popular consciousness represents an incomplete appreciation of the full range of our cultural, and especially natural history resources here in New Mexico.

This fact is apparent in the overheard comment of one visitor, who surveyed a stark sandscape and remarked, "Poor New Mexico, it has so much beach and so little ocean!" Well, it was not always so. The New Mexico Museum of Natural History in Albuquerque has documented this fact in exhibitions like "The New Mexico Seacoast," lectures and publications.

Abundant evidence from the Age of Dinosaurs, the Triassic, Jurassic and Cretaceous Periods some 220 to 65 million years ago attest to a time when seas encroached upon the land in our state and the New Mexico coastal zone was a lush rainforest. In the northeast at sites near Clayton and Tucumcari the fossilized physical remains and numerous footprints of various reptiles of this age are preserved in solidified mud and silt.

From well known fossil beds in the southeastern region of the state to the Bisti Badlands of the northwestern corner, paleontological deposits confirm the statewide distribution of a coastal forest. Multitudes of reptilian animals large and small struggled for survival here and left behind one of the richest fossil records of this time period to be found anywhere in the world.

Likewise, the earlier period, the Permian, some 60 million years older, a time before Dinosaurs appeared, is well known over a wide area of the state. According to Dr. Spencer Lucas, Curator of Paleontology of the New Mexico Museum of Natural History, Permian footprints have been reported from Villanueva, San Miguel County to the Big Hatchet Mountains of Hidalgo County. However, he says that the site in the Robledo Mountains East of Las Cruces that is the subject of Senate Bill S.2684 and our attention here today is in a class by itself. "In terms of sheer number of prints, diversity of animals represented and quality of preservation, it truly is a world-class locality deserving of special recognition and intensive scientific study. As part of New Mexico's and the Nation's natural history heritage, the site is a unique and valuable scientific and educational resource that should be preserved and interpreted for all citizens" writes Dr. Lucas.

The importance of this locale has long been known among the amateur collectors and professional paleontological community of our state. Dr. Frank Kottlowski, current Director of the New Mexico Bureau of Mines and New Mexico's State Geologist first published on the area in 1963. Indeed, a footprint slab from the locale was given in the early 1980s by Mr. Ronald Ratkevich, then of Alamogordo, New Mexico, to the New Mexico Museum of Natural History where it has been on exhibit in the "Origins" gallery for some years.

The intensified interest in the site generated by Mr. Jerry P. McDonald and his dedicated exploration and promotion of the locale is most appropriate and welcome. Bill S.2684 can provide valuable assistance to the paleontological record far beyond the limits of this important site. In addition to the protection afforded the site in Section 2, (b),(2), the study to be conducted according to Section 2, (b),(1) may prove to have broad applicability to the preservation of fossil trackways wherever they are found. Such fossil resources are notoriously difficult to curate and protect from the ongoing deterioration by the elements following exposure to water and wind, and even more importantly, to protect from vandalism of such sites either by mindless and deliberate destruction of footprints or by well intentioned removal of significant component blocks by collectors, be they individuals or institutions. The opportunity to study ways to preserve the trackways in their original context is a significant potential benefit from this legislation.

The New Mexico Museum of Natural History applauds Senators Bingaman and Domenici for their action in introducing S.2684 and encourages the efforts of the Committee on Energy and Natural Resources to provide for the protection, study and interpretation of this most significant fossil trackway assemblage.

Senator BINGAMAN. Thank you very much.

Don Wolberg is the vertebrate paleontologist with the New Mexico Bureau of Mines and Mineral Resources in Socorro and visited the site with us this morning as well, and we are very pleased to have you here, Don.

STATEMENT OF DR. DONALD L. WOLBERG, VERTEBRATE PALEONTOLOGIST, NEW MEXICO BUREAU OF MINES AND MINERAL RESOURCES, SOCORRO, NM

Dr. WOLBERG. Thank you. I am here speaking for the state geologists and for other folks, also. I think, not to spoil the tone or tenor of this love-in, so to speak, there are some important questions that have to be addressed. I think Edson hit on some very, very important questions. How to treat the tracks is a technical issue. There is a question as to the quantity and quality of tracks that ought to be exposed. Should they be exposed as quickly as possible or when is enough enough? These things have not been addressed.

Our agency is the State geology agency. We do the geology and other things for the State. We have done the geology here, and I will introduce for the record that you have to read—there will be a quiz in 10 minutes—our publications dealing with the geology of the area over the past 20 years. And they are substantial, as you can see. It would have been smarter, I think, if these had been factored into the overall approach at the site.

Most of my commentary is probably too technical for you folks and you will all go to sleep very fast. But those technical aspects should have been factored in quicker, I think. We have been interested in this project for a long time. We actually formed the cooperative grouping of Carnegie, L.A. County and Smithsonian, with the approval of the agency head and president of tech.

And we have to be very careful here. I heard things that I am not terribly pleased about, provincialism especially. Beware of the Japanese paleontologist or the German paleontologist. We cannot do that. Science is not provincial. It is to all our mutual aid to have these people, specialists, come over and pay attention to our state and specimens, science, trackways, examples, anything. We have to be very careful about that. Paleontologists throughout the country will, I am sure, oppose any provincialism on our part. And there is ample opportunity here to look at the tracks and the trackways and to handle them in an appropriate way, I feel.

There are some errors of fact in the bill and I have tried to clarify those in our written statement. Trackways do not have anything to do with how and when animals and plants come onto dry ground. That happened a long time earlier. That kind of thing is important.

Another problem is that there ought to have been, in our opinion, greater cooperation between Federal agencies. There is a Federal agency, the branch of paleontology and stratigraphy, the Federal paleontologists and stratigraphers, the people's paleontologists, an agency of 200 people or so, who ought to have been somehow involved in the whole program and could have contributed people and funds. And I do have the—I cannot speak for the U.S. Geological Survey, but I have spoken to the branch head, who has told me

I can speak for him. Anyway, he would have been thrilled to have been asked to cooperate to a greater extent.

Senator BINGAMAN. Tell me the name of the division.

Dr. WOLBERG. Branch of paleontology and stratigraphy.

Senator BINGAMAN. And that is part of the U.S. Geological Survey.

Dr. WOLBERG. John Pojeta, P-O-J-E-T-A, is the chief of that branch and the president of the largest paleontological group in the world, I guess, PS, Paleos Society, which I am secretary of.

Also, just as a final caveat, the question from the state geologist's point of view, I think we would not be overly pleased with expansion beyond 40 acres. To us, 736 acres is a whole lot to exclude from claims, perhaps. We have to understand that geology is the economic strength of our state and we have seen, you know, that crass economic interest strangled, actually beginning with coal, potash, uranium. Oil is not doing that good either, given the current price structure. So excluding land we should really think about carefully.

There is a final technical issue, in that there is an internal interior appointment as to ownership of fossils collected under permit. The interior legal opinion said whoever has the permit can own the specimen. The government transfers the actual title as in other economic resources. And that has got to be looked at carefully. I think we have got to structure anything that is done in terms of conservation very carefully. I would personally prefer if the institutions presently in the state cooperated, UNM, the museum in Albuquerque, tech and here at state.

The final question I always ask: If we did not do anything, would anything change? And Jerry would still go out and collect because he is a compulsive collector and he is a good paleontologist. And we cannot praise him too highly, the accomplishments that he has done. In any event, I will be quiet now.

[The prepared statement of Dr. Wolberg follows:]

STATEMENT OF DR. DONALD L. WOLBERG REPRESENTING THE NEW MEXICO BUREAU OF MINES AND MINERAL RESOURCES AND THE STATE GEOLOGIST, DR. FRANK E. KOTTLOWSKI.

Mr. Chairman and Members of the Committee:

My name is Donald L. Wolberg and I serve as Paleontologist with the New Mexico Bureau of Mines and Mineral Resources (NMBM&MR). I am also here representing the Director of the NMBM&MR and State Geologist, Dr. Frank E. Kottlowski. The NMBM&MR is grateful for the opportunity to comment on the proposed legislation, S. 2684, the "Prehistoric Trackways Study Act of 1990." The NMBM&MR continues to be supportive of the research interest shown in the trackway site and commends Mr. MacDonald for his determination in continuing to bring this area to the public's attention. The NMBM&MR is prepared to cooperate with any and all continued studies of the locality to the extent possible given manpower and budget constraints. We would note that it was the NMBM&MR that early on attempted to facilitate the studies initiated by Mr. MacDonald. After attempts to generate interest in the on-going studies on the part of New Mexico State University failed, the most logical cooperating institution in the area of the locality, the NMBM&MR proposed and developed a consortium approach that linked the Smithsonian Institution, Carnegie Museum of Natural History and Los Angeles County Museum in an effort to support continued research and provide specimens for public exhibit and education. We also encouraged the Las Cruces Bureau of Land Management office to continue to cooperate with Mr. MacDonald despite protestations from the Albuquerque BLM office that Mr. MacDonald's interest in the locality (and by association the cooperation of the Smithsonian Institution, Carnegie Museum of Natural History and Los Angeles County Museum) was somehow improper.

I recognize that the proposed legislation is of great importance to the science of paleontology, although most likely in a way not intended by the drafters of the Bill. The proposed legislation recognizes the importance of collection and study as the only real protection for fossils, a conclusion stated in the 1987 National Academy of Sciences document on paleontological collection and regulation. Similarly, the proposed legislation avoids locking lands up as "wilderness," making them essentially unavailable to paleontologists (as has been done in the cases of the Bisti and De-na-zin wilderness areas in northwestern New Mexico). By implication and specification, this Bill recognizes the need to study, dig, expose rocks, collect, stabilize and display fossils. I would point out that most of these activities are the usual sorts of things done by paleontologists.

Secondly, the Bill recognizes the distinction of paleontology from other sciences; most often paleontology is hopelessly confused with archeology by legislation and regulations.

Some comments may be in order about the role of the New

Mexico Bureau of Mines and Mineral Resources in matters related to geology in New Mexico. Since its establishment in 1927, the NMBM&MR has served as New Mexico's geological survey and functions as the lead state agency for all matters related to the geologic history of the State. In addition, the NMBM&MR is a division of the New Mexico Institute of Mining and Technology. The NMBM&MR maintains the largest collection of fossils in New Mexico, a geological museum for the public and is the major publisher of geological, including paleontological, literature in the region. NMBM&MR staff are mandated members of various state and regional panels, boards and commissions. Thus, for example, in addition to my duties as NMBM&MR Paleontologist, I also serve as a representative of the San Juan Basin Regional Coal Team, the Environmental Clearing House and Round Table under two Governors, and as Deputy Chair of the New Mexico Coal Surface Mining Commission. I also was a member of the National Academy of Sciences Committee on Paleontological Collecting and Regulations and a recent participant in the BLM organized meetings drafting proposed regulations based on the National Academy of Sciences recommendations. I am also the current Secretary of the Paleontological Society. Additionally, acting for the NMBM&MR, I have established cooperative study efforts between paleontologists and various government entities at the state and federal level, as well as industry, for specific localities and problems. Thus, a program is in place related to salvage of fossil specimens on State lands to be impacted by coal mining activities, and we developed the program which allowed fossiliferous cave deposits in Hildalgo County to be salvaged while also allowing industry to continue operations. This was a particularly complex situation since the cave was on State land and the mining company had a valid permit to mine, while access to the cave involved crossing BLM lands, and the most appropriate paleontologist to study the fossils was a faulty member at the University of Texas-El Paso.

NMBM&MR staff conduct geologic projects that involve recognition of geologic structures, rock sequences, fossils, geologic history and economic deposits throughout New Mexico for different purposes that usually involve development of descriptive texts, presentation of analytical chemical data and production of appropriate geologic maps at various scales. The NMBM&MR also supports the same kinds of New Mexico projects by geologists from other New Mexico colleges and universities or external institutions. Thus, for example, I would like to introduce for the record copies of our current Publications and Open-File lists that list the NMBM&MR publications and include NMBM&MR Bulletins, Memoirs, Circulars, Geologic Maps, Scenic Trips, Groundwater Reports, Hydrologic Reports and Hydrologic Sheets. We would also like to submit the following NMBM&MR publications for the Committee's record and use. These publications demonstrate the types of geologic information readily available for the region as well as the major authors of geologic studies related to this part of the State.

The publications are the following: 1) NMBM&MR Bulletin 97,

"Geology of San Diego Mountain Area, Dona Ana County, by W. R. Seager, J. W. Hawley and R. E. Clemons; 2) NMBM&MR Bulletin 100, "Geology of Souse Springs Quadrangle, New Mexico, by R. E. Clemons and W. R. Seager; 3) NMBM&MR Bulletin 101, "Geology of Rincon Quadrangle, New Mexico", by W. R. Seager and J. W. Hawley; 4) NMBM&MR Bulletin 102, "Geology of Sierra Alta Quadrangle, Dona Ana County. New Mexico," by W. R. Seager, R. E. Clemons and J. W. Hawley; 5) NMBM&MR Circular 147, "Geology of Dona Ana Mountains, New Mexico," by W. R. Seager, F. E. Kottlowski and J. W. Hawley; 6) NMBM&MR Memoir 39, "Soils and geomorphology in the Basin and Range area of southern New Mexico," by L. H. Gile, J. W. Hawley and R. B. Grossman; 7) NMBM&MR Map 57, "Geology of east half of Las Cruces and northeast El Paso 1 degree x 2 degree sheets, New Mexico," by W. R. Seager, J. W. Hawley, F. E. Kottlowski and S. A. Kelley. We would also like to submit photocopy portions of an NMBM&MR draft publication, "Geologic map of the Robledo Mountains and vicinity, Dona Ana County, New Mexico," by F. E. Kottlowski, J. W. Hawley and W. R. Seager. The portions of text included are significant because they demonstrate the early recognition of the tracks and trails being considered by this Committee today. For the Committee's information, we would also like to include copies of the New Mexico Geological Society Guidebook, "Las Cruces Country." My main point in all this is that a good deal of the technical study required by the proposed legislation has already been completed and published.

A number of errors of fact or confusing statements appear in the Bill and, in our view, should be corrected. The following comments relate to portions of the Bill that in our view require modification. These comments are intended to be as constructive as possible.

1. Firstly, relating to line 8, (1), we would point out that fossils <u>are</u> the prehistoric life forms on earth- without fossils it would be very difficult to study ancient life; the original statement is really meaningless.

2. Relating to line 1, page 2, (2), we have no doubt but that the discovered trackways are interesting, significant and with potential for exhibit and educational purposes, well worth study and display. Once again, we praise Jerry MacDonald's steadfast dedication to this project. The work he has done is simply wonderful. He has worked largely alone, under great physical hardship in a very hostile environment with little or no personal gain beyond the satisfaction that he is contributing to our understanding of ancient life forms and environments.

We do, however, suggest that, "beauty is in the eye of the beholder," and wonder whether suggesting that these are one of the paleontological marvels of the 20th century is really overstating the case. My paleontological friends (professional paleontologists, amateurs and hobbyists) would suggest that many fabulous fossil discoveries of animals and plants, have been made in the last twenty years alone, never mind the last ninety. Then too, similar trackways of roughly comparable age are known

elsewhere and may be just as marvelous. Publications describing comparable discoveries available to science and the public exist for localities in Arizona, Utah, Colorado, Connecticut and elsewhere.

New Mexico is indeed fortunate to have an abundance of fossil localities. Invertebrate fossils of comparable age are especially well documented. Similarly, comparable plant fossils are also known elsewhere.

3. Relating to line 14, page 2, (6), we point out that the tracks and trackways are of Early Permian age and do not have anything to do with documenting the emergence of life from water to land. The first land plants probably emerged during the Silurian, more than 400,000,000 years ago, far earlier than the tracks and trails we are concerned with here. The first invertebrate animals to emerge from the water may have followed close on the heels of the first plants or not gotten out until the Late Devonian Period, about the same time as the first vertebrates emerged, about 355,000,000 years ago, again tens of millions of years before the tracks and trails we are concerned with here were made. This section of the Bill should be removed.

4. Relating to line 20, page 2, (8), we doubt that a case can be made for the loss for scientific study of tracks, trails or other fossils from the area by unsupervised collecting and commercial quarrying. Firstly, there are really very, very few scientists who would be prepared today to commit a substantial portion of time and even less of their own funds to studying these or any other tracks or trails. There are just too few paleontologists in the world and the few that are out there have an awful lot to do. Even fewer specialists spend their time looking at tracks and trails.

Secondly, New Mexico is fortunate in that this locality has many, many tracks and trails to study; in fact the wealth of material is amazing. It is certainly the best such locality currently known in the State, if not the region. However, despite the apparent numbers of tracks and trails, in reality only a limited number of different kinds of animals are represented. It is likely that many of the tracks and trails are repeated over and over again. This repetition of material is the usual case in paleontology. Such redundancy is not without value but it is simply not scientifically necessary (and in a practical sense, it is impossible) to keep, excavate and study every track or trail. The simple act of excavation will destroy some material and a prioritizing of how to decide what should be done and what should be saved needs to be considered. Finally, tracks and trails are not uncommon in the Permian part of the geologic column in New Mexico.

Tracks and trails have a very limited appeal in the commercial fossil trade. Most museums, the major market for large, complex, expensive fossils, are satisfied with a limited display of tracks and trails; these institutions prefer to concentrate on more complete skeletal material. Tracks and trails demand a great deal of room, and pose special storage and

maintainance problems. In so far as I can determine, there is just one commercial dealer (in Arizona) that depends on tracks and trails for the bulk of his sales. Thus, it is not likely that there is or will be intense commercial interest in the locality.

Nearby rock quarrying operations may impact the locality unless steps are taken to mitigate against this impact. If the quarry in the area is on Federal lands, stipulations can be added to the mine permit that will prevent encroachment. It has been our experience that industry will cooperate if given the opportunity.

We believe that appropriate regulatory mechanisms already exist to insure protection of the locality, while at the same time recognizing the importance of the site and still encouraging collection of fossil tracks and trails for scientific study and public education. Importantly, this could be done with almost no expenditures of funds. We suggest that the locality be designated a National Natural Landmark (NNL). In 1962, the National Natural Landmark program was established by the Secretary of Interior to enable significant biotic communities and geologic features in the U. S. and its territories to be identified and recognized. This program is non-intrusive and operates without regards to site ownership or management. The program attempts to preserve the diversity of the natural environment by recognition of special features. To date about 550 NNL's have been recognized. Of interest is the fact that a number of these are fossil localities including the: Cleveland-Lloyd Dinosaur Quarry in Utah; the Bug Creek Fossil Area in Montana; the Fossil Coral Reef in New York; Rancho La Brea in California; Garden Park Fossil Area in Colorado; Fossil Trackway in Connecticut and Ohio Coral Reef in Ohio.

We suggest that the NNL designation option offers an appropriate means of recognizing and preserving unique values of an area while at the same time allowing for activities not available under other management options. If Bisti and De-na-zin had been designated NNLs, archeologic, geologic and paleontologic (as well as potential economic development) work could have continued.

We have some concern that the proposed legislation did not receive additional input from other Federal or State agencies in the very earliest phases of the draft process. For example, contact with the National Park Service would have appraised BLM of the NNL designation option. Similarly, we do not understand why the U. S. Geological Survey, Branch of Paleontology and Stratigraphy, was not consulted. U. S. G. S. and BLM have a standing interagency committee that regularly meets and discusses programs and projects of mutual interest. The Paleontology and Stratigraphy Branch of the U. S. G. S. is, of course, available to provide expertise to other Federal agencies. We also have concern about the fact that the Smithsonian Institution is not mentioned in the legislation. Given that Smithsonian has a very real research interest in the area, this recognition would have

been very appropriate.

The long term goals of the proposed legislation are enviable. However, given the facts of current and likely budget realities, major expenditures seem unlikely. In actuality, most of the worthwhile goals embodied in the proposed legislation can be attained without major expenditures but with a major cooperative effort on the part of interested participants. We would propose that most of the potential institutional interest, institutions that would like to have material, tracks and trails, invertebrate or plant fossils are known. These institutions include the Smithsonian Institution, Carnegie Museum of Natural History and the Los Angeles County Museum of Natural History. In addition, it may be that New Mexico State University would like to display material; NMSU maintains a museum; the University of New Mexico Geology Museum is an excellent university museum and the New Mexico Museum of Natural History may wish to display material from the locality. Additional duplicate material or casts could be made available to other interested museums at cost. Thus, the repository/display question for material from the locality is dealt with at virtually no cost to the taxpayer.

Preservation techniques for maintaining the fossil tracks and trails in the field exist. However, such efforts are complex and very costly. There are only two options: 1) impregnate and coat the tracks and trails with materials to make them impervious to weathering and also fabricate light structures to protect them essentially in the open and 2) isolate the tracks and trails from the surrounding environment by constructing a building around them. The last option creates additional complexity in that limits are placed on what can be dug out; if you build around a quarry, it gets to be very difficult to continue expand the quarry and new work stops. In addition, large scale exploitation of a deposit or locality will require development of access roads and involvement of heavy equipment of one kind or another. Ease of access opens an area to increased exploitation which in turn requires security measures which in turn requires added funding and organizational complexity. It would be possible to build a display facility/museum in one area and have activities continue elsewhere with newly quarried and collected tracks and trails moved into the facility as they are excavated. Cost again would be prohibitive. The same goals could be achieved by using regional and national facilities already in place.

There is currently much interest in paleontology and fossils by the public at large and especially young people. In my job as Secretary of the Paleontological Society, I receive hundreds of letters each year from young people wanting more information about fossils and wanting to know how to become a paleontologist. Paleontology is certainly the most popular of the geological sciences; most professional geologists get there first exposure to the science by visits to museums where they see extinct animals-not many kids become geologists by an initial interest in metamorphic petrology or isotopic geochemistry. It is an ironic

that there are fewer and fewer job opportunities for paleontologists, and fewer and fewer scholarship opportunities for graduate students interested in paleontology. The Paleontology and Stratigraphy Branch of the U. S. Geological Survey, with more than 100 years of distinguished scientific work accomplished, requires major funding infusions and additional staff positions. The Paleontological Society has aggressively attempted to enhance the availability of modest research grants for graduate students. Yet, the level of Society generated funding is totally inadequate to meet the needs of current or potential graduate students. Similarly, paleontology is under-represented among geology faculties, and even museums, throughout the Nation. I recently was shocked to find that a metropolitan museum contracted to have one of the robot dinosaur shows as a visitor promotion effort, but did not have a paleontologist on its staff. We cannot help but suggest that it would be far better for efforts to be directed towards generating program enhancement, funding and staff improvements.

Senator BINGAMAN. Let me thank you all for the testimony and let me ask a few questions. Don, let me ask you first, if the geological survey is peeved that they were not included earlier, do they have resources they would provide to help this be accomplished?

Dr. WOLBERG. I am glad you asked that question. USGS is in a terrible fix, as you probably know. It is gotten so tight that the people's geologists have to pay for their own topographic sheets to go out in the field and they pay for their own fuel. This is a branch of perhaps 2,000 highly trained, highly specialized competent folks who have been doing the people's geology since 1880 or so. They would be——

Senator BINGAMAN. So the answer is no?

Dr. WOLBERG. Well, no, no, no. Nothing is black and white. It is not a perfect world. I am told that they would try to do everything that they could do to cooperate, P&S branch would. There is also in place a standing committee, BLM/USGS standing committee, that informs each other of these kinds of programs and projects. And it did not take place in this case, and that is creating some problems, I am told, as well.

Senator BINGAMAN. Mr. Way, let me ask you: You are the acting director for the museum of natural history. Is the museum in a position to provide any resources to help pursue the further investigation and development of this kind of a site?

Dr. WAY. I would have to say a categorical yes, Senator. We have had track slabs from this locale on exhibit in our origins gallery for the last 3 or 4 years. We have been conducting field researches in the eastern and southeastern part of the State and up in the northwestern part of the State on a fairly regular basis.

This Permian time period, that is the focus here, has not been a major focus of research among the curatorial staff of the museum in the past and, for this reason, the museum has not been particularly involved heretofore in the research that is going on in this area.

The staff researchers have primarily concentrated on the Triassic, which period is very heavily represented in New Mexico, and subsequent Jurassic and Cretaceous periods, also very important fossil resources here in the State. But in the future, the state museum of natural history would, of course, be very interested in participating in any way we could and we would like to be involved in the discussions in the future.

Senator BINGAMAN. Do you have a relationship with the Smithsonian which would, as a natural course of events, bring you into involvement when something like this is identified?

Dr. WAY. I would say yes, sir. We are currently negotiating a loan of major collections from the Smithsonian geology department to the museum of natural history. We have had an ongoing cooperative venture in terms of publications and so on with the museum. And so there is a background of participation between the two institutions, yes.

Senator BINGAMAN. But just to underscore what I think I believe you said, the museum does have resources which it could make available to help with the investigation of this site?

Dr. WAY. Yes.

Senator BINGAMAN. We are glad to hear that. That is good news.

Dr. Gale, let me just ask you: In the case of New Mexico State, is there anything in the way of resources that New Mexico State could be providing to assist in this? If there was some kind of a joint project structured, could New Mexico State participate in that in more than just an observer status?

Dr. GALE. Well, the university has to be very careful about undertaking new projects without specific funding. But the university also does take some kinds of initiative from time to time if one can see support in the future. And particularly at a resource so close to us and so important to the southern part of the state, I think we should investigate what we can do as this project moves along and see if we cannot provide certain kinds of support.

Senator BINGAMAN. So you are not prepared to say, but you think it is worth investigating.

Dr. GALE. That is right, yes, sir.

Senator BINGAMAN. I appreciate the testimony of all of you and we will try to continue to keep you informed as to the progress of the legislation.

Our final panel this morning is two individuals, Mr. Jim Norton, who is the southwestern director for the Wilderness Society, and Mr. Bruce Craig, who is with the National Parks and Conservation Association. Thank you both for being here. Let us start with Jim. Why don't you go right ahead and make whatever statement you have prepared for us today.

STATEMENT OF JAMES W. NORTON, SOUTHWEST REGIONAL DIRECTOR, THE WILDERNESS SOCIETY, SANTA FE, NM

Mr. NORTON. Thank you, Senator. I am Jim Norton, the southwest regional director of The Wilderness Society. I recently moved my office from Phoenix to Santa Fe, New Mexico and from there I cover the states of Arizona, New Mexico and west Texas for the society.

The Wilderness Society is pleased to support the prehistoric pathways act of 1990. This is one of many bills that are currently pending before the Congress to protect some of the spectacular public land treasures of New Mexico, and I would like to take this opportunity to commend Senator Bingaman and the rest of the delegation for the hard work they are doing to protect these resources and carry out this ambitious agenda for New Mexico. Now is really the time to protect these resources before the pressure to develop them and other public lands increases in this area.

It is my understanding from the testimony today and also from review of various correspondence and articles in the newspaper and magazines that the resources discovered here truly are of national if not international significance. Although I am not a paleontologist myself, and I will have to defer to the scientists here that have far more expertise in this area than I do, it does seem clear to me that the area is fully worthy of the study proposed in the bill and, also, perhaps as important or more important, the protection, the interim protection, that would be provided in the bill.

Mr. Chairman, I would like to point out that the prehistoric pathways protection area authorized in the bill is just outside of a proposed wilderness area, the Robledo Mountains WSA. The Wil-

derness Society is a member of the New Mexico Wilderness Coalition and a strong supporter of the coalition's proposal for this area to be included in the national wilderness preservation system, along with the adjacent Las Uvas wilderness study area. The coalition and The Wilderness Society believe that this area has a diverse range of outstanding opportunities for hunting and rockhounding, camping, hiking, zoological sightseeing, geological and botanical research and that sort of thing.

We believe that the location that has been discovered recently nearby of these nationally significant fossils will help to enhance this area. It provides an additional value, is nearby the proposed wilderness, and I think we have a true diversity of very outstanding resources here in the Las Cruces area that complement each other.

I would not be surprised to learn that at some future date additional paleontological resources are discovered within the proposed wilderness areas. As scientific research continues, I am sure there will be other significant finds as just recently there, indeed, was off of the smaller site. I do not believe, though, that there will be any conflict between the scientific use of these paleontological resources and the preservation of the wilderness resource.

In other words, paleontological and archeological resources can be utilized in wilderness areas under carefully crafted guidelines. Both the BLM and the National Park Service, I believe, have guidelines that have been carefully crafted to deal with the interpretation of paleontological values in wilderness areas and national parks and both agencies have considerable experience in balancing the needs of scientific research with the need to preserve the wilderness areas.

In fact, several good examples, I think, of this balancing of scientific research and wilderness preservation is found here in the Southwest. In Arizona, the National Park Service administers the petrified forest area, where there has been careful excavation of dinosaur discoveries in that area.

Here in New Mexico, the BLM has had similar experience with paleontological resources in both the Denazin wilderness area and also in the Ohio wilderness study area, which, by the way, was the site of a very significant dinosaur discovery. That dinosaur was discovered by a hiker who was out enjoying the wilderness study area, and he brought it to the attention of the scientific community. That site was later excavated and is now on display for interpretation and study and other things.

So I do think we have an important wilderness right on the edge of this area, that they complement each other, and that certainly we can have a diverse wilderness protected along with the opportunity to continue the important scientific work that occurs in these sorts of areas.

In conclusion, Mr. Chairman, as I am sure you are aware, the Las Cruces area is one of the fastest growing communities in the West. The population is projected to grow to a million people by the year 2040. This rapid growth, I think, is in part due to the high quality of life here and that results, in part, from the diverse opportunities that I mentioned earlier. I think these paleontological resources simply add to that diversity and help to make sure that

the resources here are used to the benefit of the citizens of New Mexico.

And I encourage you to continue your work to make sure that these resources are protected well into the future. Thank you.

[The prepared statement of Mr. Norton follows:]

THE WILDERNESS SOCIETY

STATEMENT OF JAMES W. NORTON, SOUTHWEST REGIONAL DIRECTOR OF THE WILDERNESS SOCIETY, BEFORE THE SENATE SUBCOMMITTEE ON PUBLIC LANDS, NATIONAL PARKS AND FORESTS ON S-2684, THE PREHISTORIC TRACKWAYS STUDY ACT OF 1990, LAS CRUCES, NEW MEXICO, JULY 6, 1990

Mr. Chairman and members of the subcommittee, I am Jim Norton, the Southwest Regional Director of The Wilderness Society. I am based in Santa Fe and cover Arizona, New Mexico and West Texas for the Society. Thank you for the opportunity to present this testimony today.

The Wilderness Society is a national environmental organization dedicated to the wise management of the federal lands. We have approximately 370,000 members nationwide including more than 3000 who reside in New Mexico.

The Wilderness Society is pleased to support S-2684, the Prehistoric Pathways Act of 1990. This is one of many bills currently pending before the Congress to protect the spectacular public land treasures of New Mexico. I would like to take this opportunity to commend both New Mexico Senators Jeff Bingaman and Pete Domenici, as well as the rest of the delegation, for their foresight in carrying out this ambitious agenda. Now is the time to protect these precious resources, before the pressure to develop these and other public lands increases.

It is my understanding that the prehistoric trackways discovered in the Robledo Mountains near Las Cruces is a nationally significant collection of extremely well preserved fossils. Having reviewed correspondence from the Smithsonian Institution National Museum of Natural History, Carnegie Museum of Natural History and Bureau of Land Management (BLM) as well as articles in Geotimes, Earth Science and National Geographic, I am convinced that these fossils are fully worthy of the study and interim protection proposed in S-2684. I am not a paleontologist, however, so I will have to defer on this matter to the scientists here today who have far more expertise in this area than I.

Mr. Chairman, I would like to point out that the Prehistoric Trackways Protection Area authorized in S-2684 is just outside of the Robledo Mountains Wilderness Study Area (WSA). The Wilderness Society is a member organization of The New Mexico Wilderness Coalition and a supporter of the Coalition's proposal

for a wilderness area composed of the Robledo Mountains and nearby Las Uvas Mountains (WSA). The Coalition feels that opportunities for hunting, rockhounding, camping, hiking, horseback riding, nature photography and geological, botanical and zoological sightseeing are outstanding in the area. The location of nationally significant fossils nearby, and the opportunity for interpretation of these resources afforded in S-2684 can significantly enhance the value of this proposed wilderness area.

I would not be surprised to learn at a future date that paleontological resources are located within the proposed Las Uvas/Robledos Wilderness Area. As scientific research continues, other significant finds may be likely. If such resources are discovered, Mr. Chairman, I believe that there is no conflict between the scientific use of the fossils and preservation of the Wilderness. Both the BLM and National Park Service have carefully crafted guidelines for the interpretation of paleontological values in wilderness and considerable experience in balancing the needs of scientific research and wilderness preservation.

Several of the many examples of agency managers balancing wilderness preservation with scientific study are found here in the Southwest. The Park Service in Arizona has for many years allowed careful excavation of significant dinosaur discoveries in the Petrified Forest National Park and Wilderness. In New Mexico, paleontological study has continued in the De-na-zin Wilderness Area, and one of the most significant dinosaur finds in the entire Southwest was discovered and brought to the attention of the scientific community by a hiker in the Ojito WSA northwest of Albuquerque. This largely intact dinosaur was carefully excavated from the WSA for further study, interpretation and display.

As I am sure you are aware, Mr. Chairman, the Las Cruces area is one of the fastest growing metropolitan areas in the nation. The population of this area is projected to reach one million people by the year 2040. This rapid growth is due in part to the high quality of life that results from the diverse natural and cultural values here. I encourage you to continue your efforts to protect these resources so that the high quality of life continues well into the 21st century and beyond.

That concludes my testimony today, Mr. Chairman. I would be happy to answer any questions that you or other members of the Subcommittee might have.

Senator BINGAMAN. Thank you very much. Let me call on Bruce Craig to go ahead with any statement he has.

STATEMENT OF BRUCE CRAIG, CULTURAL RESOURCE PROGRAM MANAGER, NATIONAL PARKS AND CONSERVATION ASSOCIATION

Mr. CRAIG. Thank you, Senator. My name is Bruce Craig. I am the cultural resources program manager for National Parks and Conservation Association, which is a private, nonprofit group with about 150,000 members, and our charge is to promote the preservation and the protection and the public understanding of our nation's national park system.

Senator, we are certainly pleased that you and the other members of the New Mexico delegation have introduced this legislation seeking to protect the paleontological resources that are significant to the history of our planet. Also I would like to thank you right now for your efforts on behalf of the petroglyphs, on behalf of the Pecos National Monument and, hopefully, also on behalf of the Glorietta Battlefield in the upcoming months.

National Parks and Conservation is pleased to support this legislation. We have some recommendations for strengthening specific provisions of this legislation, though. I suspect what has been discovered here by Jerry MacDonald is actually a world-class resource, no less significant than the Dinosaur National Monument, and it is for this reason, Mr. Chairman, that we believe this area deserves immediate administrative designation as a national natural landmark.

This is an administrative designation that can be made by the Secretary of the Interior, and we urge the Secretary of the Interior to coordinate BLM with the National Park Service, that has the administrative authority over this program, to prepare the necessary paperwork for designation of this area as a national natural landmark.

Furthermore, we believe this legislation should be actually retitled. I know that the New Mexico delegation always raises some concerns when people suggest new titles, but we do have a suggestion for a title of this bill to be called the Prehistoric Trackways National Monument Study Act of 1990.

We do have some technical amendments, which I have itemized in our testimony and will not go over all of those right now. But I would like to just focus maybe on two or three of the more important ones. First off, section 3 deals with the interim withdrawal, and we certainly fully support the intent of this section, which is designed to give the resource area a higher level of protection. I am very pleased to hear Mr. Woodard today say that he believes the area should be 736 acres. We suggest in our testimony a two-square mile area, which I guess is slightly larger than 736 acres.

We also do believe that really what is necessary here is a full-scale comprehensive scientific reconnaissance of the Robledo Mountain region, especially these two square miles where the documented discoveries have already been made. The area also has not just scientific, but it has interpretive value, and as Doug Faris of the park service mentioned, it also has some cultural significance. As

Jim has mentioned, some wilderness significance is a possibility there, as well.

We do have some current concerns, though, over the quarry, which is right now classified as a community pit and is operated under a salable minerals permit that is issued by the BLM. We think that continuance of this operation may—and I emphasize the word "may," because we really do not know right now—may be destroying some fossils. And we would recommend that an immediate moratorium be placed on further sales pending a scientific investigation to determine whether or not the quarry actually does contain fossil remains.

Section 4 of the legislation, this is the portion of the bill that we believe holds the key to the future preservation of this nationally significant resource. And I would like to read to you just very briefly some suggested language that we have that incorporates some of the cooperative agreement concerns that the BLM and the National Park Service have.

I would say under the section dealing with the study, "The Secretary of the Interior, in consultation and cooperation with the State and local governments, the Smithsonian Institution and other Federal institutions and other institutions of higher learning, may enter into cooperative agreements and shall conduct a study of alternatives for the preservation, protection and interpretation of fossil resources in the vicinity of the Robledo Mountains. The study shall include an assessment of the area's potential for possible designation as a national monument."

The other suggestion that we have in relation to the study and report is that we all know that there is a historical pattern of institutional rivalry that exists between the Bureau of Land Management and the National Park Service. And although we see the Bureau of Land Management taking the lead on this particular project, we do feel that the National Park Service should be very closely working with the BLM.

In fact, what we would suggest is that the study, once it is completed, before its transmittal to Congress should be submitted to the Secretary of the Interior's own national park system advisory board, which is a secretarial advisory board, and have them make a recommendation as to whether they believe this area warrants designation as a national monument. And perhaps also they can comment and give some advice on whether or not this area should be administered in the future by the Bureau of Land Management or perhaps by the National Park Service or by some type of a cooperative management approach.

So with that, Mr. Chairman, I will be glad to answer any questions that you might have.

[The prepared statement of Mr. Craig follows:]

National Parks
and Conservation Association

STATEMENT OF BRUCE CRAIG
CULTURAL RESOURCE PROGRAM MANAGER
NATIONAL PARKS AND CONSERVATION ASSOCIATION

SUBMITTED TO THE

SUBCOMMITTEE ON PUBLIC LANDS, NATIONAL PARKS AND FORESTS
ON S. 2684
PREHISTORIC TRACKWAYS STUDY ACT OF 1990

FIELD HEARING, LAS CRUCES, NEW MEXICO
JULY 6, 1990

My name is Bruce Craig, Cultural Resources Program Manager for the National Parks and Conservation Association, a non-profit membership organization founded in 1919 that seeks to promote the preservation, protection and public understanding of our nation's national park system. Our organization appreciates the opportunity to testify on behalf of our 150,000 members on S. 2684, legislation seeking to authorize a study to assess various alternatives for the protection and interpretation of Fossil Trackways and other nationally significant paleontological resources recently discovered in the vicinity of the Robledo Mountains near Las Cruces, New Mexico.

We commend Senators Bingaman and Domenici for their efforts to see that these paleontological resources significant in the history of our planet are protected and interpreted. Fossils such as these recently discovered in the Robledo Mountains can be found in only a handful of places throughout the world. Dinosaur National Monument in Colorado and Utah (an area administered as a unit of the National Park Service) for example, is famed for its specimens of great scientific and educational value which contribute to our understanding of dinosaur anatomy, ecology and community structure. Sites such Fossil Trackways also have great scientific value and in addition hold the potential for giving visitors to such an area, a unique opportunity to view firsthand the tangible remains of geologic time passed.

Mr. Chairman, National Parks and Conservation Association is pleased to support this legislation. We would however, like to suggest for the Subcommittee's consideration, a number of recommendations for strengthening provisions of the bill.

As presently drafted, this legislation directs the Secretary of the Interior to conduct a study of the Robledo Mountain area to assess the relative significance of sites and the importance of the recent discoveries; second, to

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evaluate alternatives as to how best to curate, display and interpret the fossils found in the area; third, to recommend a proper administrative designation and agency for the site; and finally, to provide for an interim withdrawal of a 40 acre area from operation of public land law. I would like to address a few of these issues briefly.

National Significance.
I suspect what has been discovered by Jerry Paul MacDonald, field director of the Smithsonian based Paleozic Trackways Project in the spring of 1987, is a world-class resource no less significant than Dinosaur National Monument. According to Nicholas Hotton III, Research Curator, Department of Paleobiology with the Smithsonian Institution, "The specimens excavated so far are tremendously diversified. Nearly the whole spectrum of Lower Permian animals are represented." Mr. Chairman, the footprints are over 280 million years old; they are among the oldest in the world and are in a state of near "perfect preservation." The significance of this area is not merely an assortment of known prehistoric footprints but the discoveries include footprints of unknown prehistoric creatures (tracks of over 50 vertebrate animals have been discovered of which at least half are new), plant life and invertebrates (many undiscovered species as well as nearly 50 arthropod and insect trackways) and habitat (even the weather has been fossilized---280 million year old raindrops often dot the surface of the fossil layers as well as mud cracks and ripple marks from wind and shore). And now, with the discovery of bone in one deposit, the area is a paleontologists dream.

Preservation of the Resource
Mr. Chairman, we believe this area deserves immediate administrative designation as a National Natural Landmark. Furthermore, thoughtful consideration should begin immediately to assess the area's potential for designation as a National Monument. Both designations may be made by administrative declaration by the Secretary of the Interior and/or in the case of National Monument designation, by congressional action. We hope that is the intent of this legislation. In the meantime, prior to passage of this bill, we urge the Secretary of the Interior to coordinate with the Director of the National Park Service in order to prepare the necessary paperwork for designation of the area as a National Natural Landmark.

Mr. Chairman, we offer the following recommendations for amending the proposed legislation:

Section 1 Short Title: We recommend that the Act should be entitled the "Prehistoric Trackways National Monument Study Act of 1990." We believe this name is more descriptive of the nature of the questions the study should seek to address.

Section 2 Findings and Purposes: We recommend the words "bone fragments" be added to Section 2-(a)-(3) (page 2 line 7) thereby reflecting the most recent significant findings within the proposed study area.

In keeping with the purposes of the Act we recommend Section 2-(a)-(9) (page 3 lines 1-2) should be amended to read, "to assess its suitability and feasibility as a National Monument, thus insuring their continued protection and value for scientific interpretation and education."

Section 2-(b)-(1) (page 3 line 5) should be amended to read "...appropriate means to inventory, map and protect the discoveries..." thus adding the words "inventory, map" to the purposes of the legislation.

With the recent discoveries of bone fragments and additional fossil trackways in the vicinity of the Robledo Mountains, we also recommend Section 2-(b)-(2) be broaden so as to read, "to provide for interim protection of the fossils and scientific values of the region."

Section 3 Interim Withdrawal: Mr. Chairman, we fully support the intent of this section which seeks to give the resource area a higher level of protection. However, we do not believe the withdrawal area is large enough, nor should mineral leasing be permitted in the study area as currently provided for in the legislation. Also, we have concerns that the two year withdrawal time-limit may not be long enough to enable the administration and/or Congress to act on the study recommendations.

While the initial discovery of the fossil trackways indeed is within the 40 acre suggested withdrawal area, additional significant discoveries have been found in other areas not immediately contiguous to the primary site. According to Dr. Hotton of the Smithsonian, "The scientific potential of the vicinity is enormous. But how good the area is in terms of its scientific value is dependent on how well it is exploited by researchers." The fact is, right now Jerry MacDonald is the only researcher actively working in the area; many potential significant sites rich in paleontological remains may yet await discovery.

Mr. Chairman, what is needed is a full scale comprehensive scientific reconnaissance of the Robledo Mountain region, especially a critical two square mile area where documented discoveries have already been made. Such a reconnaissance is needed to determine what areas in the region are of scientific and interpretive value. Such a study would also prove helpful in determining a suitable administrative boundary for a new national monument.

Mr. Chairman, though the proposed study area is currently managed as an "Area of Critical Environmental Concern (ACEC)" by the Bureau of Land Management (BLM), we have great concern over the continued operation of a quarry located a half mile or so from the primary discovery site. Our understanding is that the quarry is currently considered a "community pit" and is operated under a saleable minerals permit issued by the BLM. Continuance of this operation may be destroying fossils. We recommend report language calling for an immediate moratorium of further sales pending a scientific investigation to determine whether or not the quarry contains fossil remains.

Mr. Chairman, our recommendations to strengthen this section may be summarized as follows:

"(a) WITHDRAWAL---The area of important discoveries consisting of approximately two square miles, as depicted on the map described in subsection (b), are withdrawn from the operation of public land laws, for not to exceed 3 years after the study is transmitted to Congress."

Section 3-(b) Map: This paragraph references a map of the study area. We believe the map should be drawn to reflect all of the known fossil sites---an area of approximately two square miles---plus a satellite area some twenty miles distant where bones of prehistoric animals were recently discovered.

Section 4 Study and Report: This portion of the legislation holds the key to the future preservation of this nationally significant resource. This section should mandate that a multi-agency multi-jurisdictional "Suitability/Feasibility study be prepared that would fully explore all relevant alternatives for the preservation, protection and interpretation of this area in perpetuity. We recommend the following rewrite of Section 4-(a) (page 3 lines 22-24 and page 4 lines 1-2):

"(a) STUDY---The Secretary of the Interior, in consultation and cooperation with State and local governments, the Smithsonian Institution and other institutions of higher learning, the National Park Service and other Federal bureaus, may enter into cooperative agreements and shall conduct a study of the alternatives for the preservation, protection and interpretation of the fossil resources in the vicinity of the Robledo Mountains. The study shall include an assessment of the area's potential for possible designation as a National Monument."

Section 4-(b) (page 4 line 8): This section should require an independent review of the report by a qualified advisory board. While we expect the Bureau of Land Management to be the lead federal agency preparing the report, there is a very strong possibility that the area may be eligible for designation as a unit of the National Park System. Given the existence of a historical pattern of institutional rivalry between the Bureau of Land Management and the National Park Service, we recommend the Secretary of the Interior charge his National Park System Advisory Board to review the draft report and submit comments as they relate to the reports findings. Therefore, we recommend the following words be added to Section 4-(b) (page 4 line 3): "Following review and comment by the National Park System Advisory Board, not later than two years after...

Section 4-(c) (page 4 line 9-14) outlines the contents of the study. As previously mentioned we believe the study should serve as a new National Monument Suitability/Feasibility report. We recommend the following language to accomplish this objective:

"Contents of Study---(1) The study required by subsection (a) shall include a suitability/feasibility assessment of certain lands in the vicinity of the Robledo Mountains as a National Monument. The study shall include: an identification and inventory of key sites of potential scientific value and an analysis of the importance of the discoveries in the region (b) adequate documentation to facilitate preparation of National Natural Landmark, National Register and other appropriate nominations, (c) an assessment of management alternatives to insure the continued preservation, protection and interpretation of the resources within the study area, and (d) an evaluation of alternatives to provide for visitor education, including the possibility of developing a facility in southern New Mexico that would evaluate, curate, display and interpret the fossil resources found in the area."

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Finally Mr. Chairman, Section 4-(c)-(2) seeks to recommend the proper administrative designation for the area and identify the agency that should be designated to manage the area. As discussed above, we recommend the Secretary of the Interior submit the report to his National Park System Advisory Board for their views and opinions as to the best administrative designation and identification of the most appropriate Interior department bureau to administer the area.

Mr. Chairman, that concludes my comments. I would be pleased to answer any questions you or the other members of the Subcommittee may have.

Senator BINGAMAN. Thank you very much. To follow up on that point that you were just making, are there examples where there is cooperative management of monuments that you are familiar with that would serve as models for what you are proposing here?

Mr. CRAIG. Most of the national monuments—historically the national monuments were established as a separate, actually a system within the system, back before 1930, where there was the National Park System and then there was a national monument system. But all of the national monuments were incorporated into the National Park System back in the 1930's and the 1940's.

I do believe—I believe that the forest service actually administers one or two national monuments right now. I am not sure. Mr. Woodard, perhaps, could tell us whether the Bureau of Land Management has any national monuments that you know of?

Mr. WOODARD. None.

Mr. CRAIG. Certainly there can be cooperative management arrangements, though, that can be done through the tool of a memorandum of agreement or simply a cooperative agreement, where Federal agencies could work in partnership. Certainly that seems to be the trend in national park management today, what we call partnership parks, where there is a combination of Federal, State and local, sometimes even ownership of land. Petroglyphs is a good example where these entities came together to preserve and protect a nationally significant resource.

Senator BINGAMAN. Let me ask about your suggestion that the administrative designation be accomplished as a national natural landmark. What is the legal significance of that designation?

Mr. CRAIG. The legal significance of it, really it does not provide the area with any higher level of protection per se except with the possible expenditures of Federal funds on that land. In other words, it would be designated the highest protection, the highest recognition of national significance that can be given to a resource.

There is a national natural landmark program that the Department of the Interior administers and also a national historical landmark program as well, which is largely for the historic areas. So what it does, it sets aside the area by saying this is a nationally significant resource and worthy of special attention. But it does not provide any enhanced protection level.

Senator BINGAMAN. It does not accomplish what a withdrawal of the land would.

Mr. CRAIG. That is correct. The withdrawal would be necessary even with a national natural landmark.

Senator BINGAMAN. Jim, let me just ask your thoughts now. You have suggested that this area be included in a wilderness area. If that were to occur, how would that affect the ability to go ahead and investigate and develop the site along the lines that Jerry MacDonald suggested?

Mr. NORTON. Senator, this area is just outside of a proposed wilderness area. And I would not suggest that it be added to the wilderness. If it did happen to be located within a wilderness study area or a wilderness, I think both the BLM and the park service would have the ability under their current guidelines to allow carefully planned scientific research to continue that would be consistent with protecting the wilderness or national park values.

One of the key standards that both agencies, I believe, use in determining what types of activities would be allowed to continue is the significance of the find to science. If it is simply a common find that has been discovered in other locations, particularly outside of the park or wilderness, then generally they are more restrictive in allowing that common resource to be extracted.

On the other hand, if it is a significant find to science, they are much more flexible in terms of allowing use of motor vehicles and excavation and that sort of thing, if necessary, but, again, under carefully crafted circumstances.

I do think here that the key find is outside of the wilderness and that there is no possible problem in that respect. However, that as science continues to take place here, there may be discoveries found within the proposed wilderness area as well. And I think the paleontological resources are like archeological resources as well, and others, things that enhance wilderness values, add to the diversity of the area, and that the scientific exploration can continue in those areas under the carefully crafted guidelines of both agencies.

Senator BINGAMAN. Do you see other conservation purposes that would be achieved by going forward and doing the study that we contemplate in this legislation?

Mr. NORTON. Absolutely, and I think the comments made earlier, I believe, by Doug Faris from the Park Service about the need to explore the full range of natural and cultural resources in this area is important, because it is a diverse area. It is in, I think, a very valuable recreation resource and educational resource for the Las Cruces area and southern New Mexico and for the nation as a whole.

And I think that there is real opportunity here for the interpretive displays and facilities to not just focus on the paleontology, but also to broaden that out to other national and cultural values that are in existence in this area.

Senator BINGAMAN. Let me just ask this, sort of going back to the point that I questioned Bruce Craig about a little before. But could you clarify the distinction between a national monument and a national natural landmark as you were using those terms?

Mr. CRAIG. A national natural landmark is merely an administrative designation that says an area is nationally significant. That is basically all it does. A national monument can be established either by Congress declaring a national monument by act of Congress, or actually the Secretary of the Interior has the authority also to declare a national monument.

In other words, if the Secretary of the Interior wanted to right now, after the boundary study is actually completed or after your study is done here and it is his opinion, at least, that the area is worthy of being designated a national monument, it could be administratively designated without congressional approval. That has not been happening recently, although by terms of the Antiquities Act it would be possible to do that.

A national monument is generally administered by the National Park Service, and that is the other designation and it becomes a full-blown unit, managed and owned by the Federal Government and in most cases usually by the National Park System.

Senator BINGAMAN. As I understand, it is your recommendation that the Secretary should administratively designate a national natural landmark and that once the legislation is passed and the study is done, at that point Congress or the Secretary, but most likely Congress, since that is the way these things are happening, should proceed, in your view, to go ahead and designate it a national monument?

Mr. CRAIG. Yes, that is correct. The times when the Secretary has declared a national monument usually has been when the area is immediately threatened. And, of course, right now we do not have a major significant threat to the resources of this particular area and, therefore, administrative designation of a national monument by the secretary really would not be necessary.

President Carter used that authority back when he established the national monuments in Alaska in anticipation of national parks and national monuments and other areas being established. But Congress would be the rightful body to ultimately make that decision.

Senator BINGAMAN. Let me thank you both very much for testifying. We appreciate it, and I think you have made some valuable points here that we appreciate hearing.

Let me just say a couple of things before we conclude the hearing. First, I wanted to just comment. Don Wolberg had indicated in his testimony his concern that we not become parochial, which I certainly agree with; that science and scientific knowledge is international by its very nature, and clearly we need to encourage interest wherever we can find it in whatever we discover.

At the same time, let me just indicate, from the perspective I come from, I grew up 100 miles or so away in Grant County, which, of course, is the original site for the Mimbres culture. And it has disturbed me most of my adult life to become aware of how much more appreciation there is for the Mimbres culture in the East Coast and in Europe and in various parts of the world than there has been in Grant County itself during much of that time. Because I think we did not take the steps necessary to really preserve a significant portion of that culture there and to interpret it so that local people could understand the significance of what they were growing up around.

And I would hate to see that same thing happen here. I would hate for people to grow up in Las Cruces and Dona Ana County in southern New Mexico and have to wait until they get off to college somewhere in the East Coast to find out the significance of some of the finds which are here and are located here.

So I think it is very important for the local community and for our state that we do what we can to maintain the resource here, not all of it, since there is obviously going to be a great deal, but that we maintain a very significant ability to interpret it here and to ensure that people who grow up in our State and who visit our State understand the importance of what we have found and that much of the research that goes on occur here as well. So I do think it is important for us to maintain at least that much parochialism in our deliberations.

Let me thank everybody for attending today. I think that, first, I do again want to thank Dale Bumpers and the Senate Energy Com-

mittee for agreeing to have this hearing. We will try to have another hearing later on, either later this month or as the year progresses, to move ahead with the legislation. I think it is very important legislation and time sensitive, and we need to deal with it if possible before we recess for the summer.

I want to thank Tom Williams, who is the senior professional staff member for the committee, for being here and helping us conduct this hearing today. The witnesses, I think, have made some excellent recommendations on ways to strengthen the bill, and I hope also that some of the witnesses will be able to follow through on their own thoughts about being able to provide assistance and work with Jerry MacDonald in seeing that he has the backup and resources he needs to continue with his work.

And I hope very much that a year from now, or something like that, we can get back together and get the results of this study that we are contemplating in the legislation and hopefully at that time be able to make the correct decision on what should be done with this very significant national resource.

If there are other people in the audience who would like to make statements for the record, we will be glad to receive those in the next couple of weeks.

We will conclude the hearing with that. I again thank you all for being here.

[Whereupon, at 11:40 a.m., the hearing was adjourned.]

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